FLIGHT
and
AIRCRAFT ENGINEER

Editorial Director G. GEOFFREY SMITH, M.B.E.
Editor - - C. M. POULSEN
Assistant Editor - MAURICE A. SMITH, D.F.C. (WING CDR., R.A.F.V.R.)
Art Editor - - JOHN YOXALL

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1
Telegrams: Flightpres, Sedist, London. Telephone: Waterloo 3333 (50 lines.)

COVENTRY: 8-10, CORPORATION ST. Telegrams: Autocar, Coventry, Telephone: Coventry 5210.
BIRMINGHAM, 2: KING EDWARD HOUSE, NEW STREET. Telegrams: Autopress, Birmingham. Telephone: Midland 7191 (7 lines).
MANCHESTER, 3: 260, DEANSGATE. Telegrams: Iliffe, Manchester. Telephone: Blackfriars 4412.
GLASGOW, C.2: 26B, RENFIELD ST. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Abroad: Year, £3 1 0. 6 months, £1 10 6.

Registered at the G.P.O. as a Newspaper

No. 1959. Vol. L. July 11th, 1946 Thursdays, One Shilling.

The Outlook

Transonic Research by Rocket and Radar..

THE time may be near when diligent investigators of aerodynamic phenomena (those at least concerned with high-speed flight) will desert their wind tunnels and laboratories for a radar tracking room, for in radar-plotted research models, with rocket or athodyd propulsion, we may hold the key to practical flight at transonic and supersonic speeds. If this proves to be so—and there is every indication that it will—the key will have been delivered into our hands by German scientists; it was they who developed the practical liquid-fuel rocket and applied its tremendous thrust to high-speed aircraft, research missiles and controlled weapons.

The Vickers' transonic model described in this issue is virtually a scaled-down Miles M.52 without a pilot and with no annular air intake for the gas turbine. Propulsion is by a bi-fuel rocket using "T-Stoff" and "C-Stoff," the properties of which were demonstrated in the Walter rockets used in the Me163 and destined for the supersonic DFS 346 and the air-launched DFS 228.

At present both the Vickers' model and the full-scale M.52 have straight wings, but it is more than probable that sharp sweep-back will be tried, on the models at least. Already the American Bell concern has test-flown a machine with swept-back wings, after the German pattern, and has developed a rocket-propelled transonic aircraft, but whether the two have been wedded is uncertain.

Other American manufacturers are interested in rocket-powered research aircraft and models, and we in Britain must look forward to the day when the roar of the rocket is once more heard in the land. This will symbolise our determination that airframe design, now of cardinal importance if our peerless turbine-jets are to be most profitably employed, shall benefit from the most modern methods of investigation.

. . . and Radio

Research models having yielded basic data for the construction of supersonic aircraft the next step will be to build full-scale prototypes adapted for specific duties. These must undergo routine performance and handling tests and in the early stages of development at least, might take-off, manœuvre and land under radio control. The immense possibilities of this form of control have been demonstrated by our own "Queen" series of target aircraft and more recently by U.S. Army and Navy "drones" used in the Bikini atom-bomb tests.

Thus mastery of the three "R's"—rockets, radar and radio—may lead us to the Elysian fields beyond the sonic barrier.

Transatlantic Service

IN the matter of North Atlantic airline operation we might be described as veteran beginners. July 1st saw the opening of a regular British London-New York passenger service, and although for the present American Constellations are being used, Tudor 7's are expected to be ready by November and should be in service early in the New Year. Our immediate post-war problem of obtaining suitable air liners to operate the service is thus satisfactorily solved for the time being, and all-important operational experience is being gained side by side with the airlines of other countries. But for the war, this service, foreshadowed in Ottawa in 1935, would have been inaugurated much sooner. In fact, 1941 first saw two-way, all-the-year-round flights attempted and proved to be a practical undertaking, even without the advantage of high altitude, pressurized cabins. A second problem foreseen in pre-war days, the conquest of winter weather over the North Atlantic, has thus also proved capable of solution.

Last week the question of costs was discussed in *Flight* and those convinced that fares by air would be prohibitive in competition with ocean liners now have figures in black and white to confound their arguments. This removes problem number three.

There is no doubt that a flight to New York, of the

type described elsewhere in this issue, by any one of the civil scheduled airlines now operating, has become a matter of routine—not an adventure. Comfort and service, at least comparable with a long-distance rail journey, can be confidently expected, and, whether one is young or old, weak or strong, the "rigours" and "dangers" can no longer reasonably cause dismay. Overweather flying provides an apparently motionless ride and "Dinner in London, lunch in New York" is travel service indeed.

No Room at the Inn

MORE than once we have stressed the need for special building and other priorities to match the urgency being shown in other aspects of air transport development. While we appreciate the difficulty of obtaining, in the present state of things, the necessary high priorities, the need for additional accommodation at most of our civil airfields has become acute, and the time must soon arrive when, in fact, any further operational development is impossible.

At Croydon, for instance—where, as a once permanent peacetime centre, the situation for both operators and passengers should be comparatively good—neither office nor hangar accommodation is in any way adequate, and the passengers are largely without means of relaxation and refreshment. The hotel is still used as a Transport Command Mess, and, though occasional passengers may presumably make use of it at the discretion of the P.M.C., there is no other near-by restaurant. While waiting for aircraft or friends, the public must sit in the large and busy-looking main hall, where, it is agreed, there are plenty of seats.

The operators themselves are confined in the minimum possible office space, where flying organization is completed in a kind of bedlam of telephone bells and hurrying bodies. As an indirect consequence of this overcrowding, some "executives" are putting in quite an unhealthy number of hours of work at high pressure simply because, even if more staff were available, there would be no room for them. The hangar situation is equally difficult, and this is slightly worsened by the presence of a lot of crashed aircraft remains—belonging, presumably, to the Accidents Branch—which could very easily be dumped elsewhere.

Even those airline operators who are being transferred to Northolt are not very happy about it, since the conditions there are just as difficult—and cannot reasonably be expected to be any better in the present transition stage.

Meanwhile, prospective charter operators are being told by the Ministry of Civil Aviation to rest in patience until September, when the accommodation question is expected to improve with the departure, presumably, of Transport Command. The general feeling, however, is that this Command's personnel and aircraft cannot then move out—for the very good reason that there is no place to which they can go.

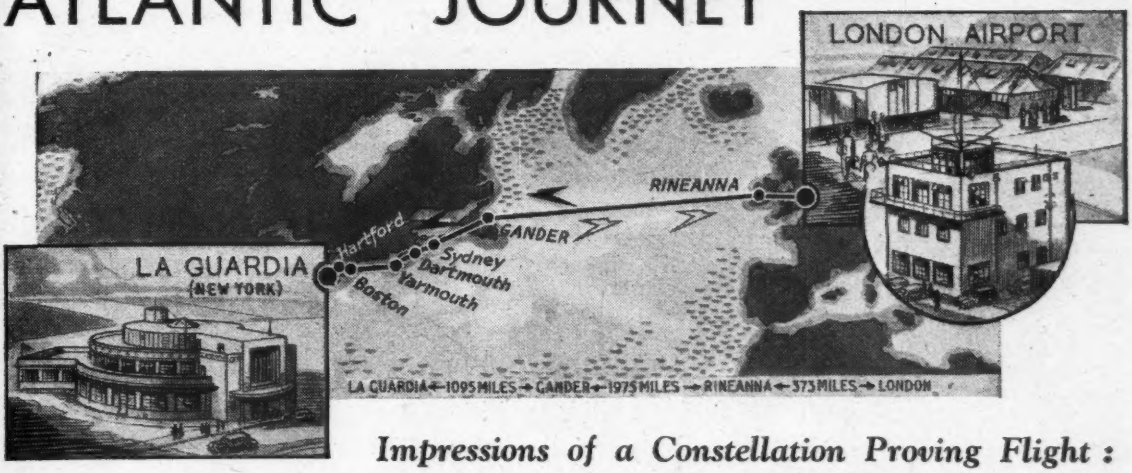
We are not attributing any particularized blame for this state of affairs, since it is the result, very largely, of the aftermath of a war followed by the very rapid expansion, in particular, of charter operations. But something can obviously be done about it if all the right people agree to do so, and we can merely state the facts, as we see them, for their benefit. Even the erection of a few huts and the clearance of the "crash" hangar would make a great deal of difference.

CONTENTS

The Outlook	27
Atlantic Journey	29
Vickers in Scandinavia	33
Here and There	34
Transonic Research	36
Notes from Farnborough	38
Handling Air Cargoes	a
Civil Aviation News	44
Another Civil Aviation Debate	46
Approach by Ground Control	47
Correspondence	50
Service Aviation	51

FOR THE LOWLANDS SEA: A Fairey Firefly I two-seat reconnaissance-fighter of the Royal Netherland Naval Air Service is folded for stowage on the carrier H.N.M.S. *Karel Doorman* (ex *Nairana*). A Dutch Firefly unit has been training at a Royal Naval Air Station in Scotland and will soon supplement their Mark I Fireflies with Mark IV's. The Fireflies are far removed from the Fokkers used by the R.N.N.A.S. in 1940, when all aircraft and ships were ordered to proceed to France or England.

ATLANTIC JOURNEY



Impressions of a Constellation Proving Flight: To New York with B.O.A.C.

by Maurice A. Smith

ALTHOUGH twenty-seven years almost to the day have elapsed since the North Atlantic ocean was crossed by air for the first time, the inauguration of a regular passenger service from London to New York by B.O.A.C. is an event of great importance. Since the late Sir John Alcock, pilot, and Sir Arthur Whitten Brown, navigator, successfully crossed from West to East on their Vickers Vimy on June 14, 1919, several thousands of crossings have been made in each direction. No airline company in the world can match the operating experience of B.O.A.C. on this route or the flying experience of B.O.A.C. captains who pioneered the North Atlantic services. Space does not permit a repetition of the many outstanding achievements which form a background to the company's present service, but a brief tabulation of some of the historical highlights will be interesting and instructive:—

1935:— Ottawa Conference planned British transatlantic commercial service.

July, 1937.—Imperial Airways *Caledonia* (Short flying boat) made east to west test crossing.

July, 1938.—*Mercury*, upper component of the Short-Mayo composite aircraft, flew from Foynes to Montreal non-stop.

Aug., 1939.—North Atlantic Mail Service started by Imperial Airways using *Cabot* and *Caribou*. (Passenger service planned for 1940.)

Aug.-Sept., 1940.—*Clare* made double crossings, returning with American ferry pilots.

Aug., 1941.—Boeing boats, *Berwick I*, *Bristol I*, *Bangor I*, on North Atlantic service in summer. (South Atlantic in winter.)

Sept., 1941.—B.O.A.C. senior pilots took part in delivery by air in winter of first twenty bombers for the R.A.F.

Sept., 1941.—Two-way service on modified Liberators commenced.

Nov., 1943.—Delivery service expanded to two-way double daily service returning ferry pilots and carrying official passengers and freight.

Sept., 1944.—1,000th transatlantic crossing made by B.O.A.C.

June, 1945.—Constellation *Balmoral* made record non-stop commercial flight from New York to London Airport (11 hr 24 min).

To complete the story, the total of crossings by B.O.A.C. is now substantially over the 2,000, and more than 20,000 passengers have been carried, together with 3,775,000lb of mail and freight. Forty-five captains have made over 100 crossings, and twelve of these are flying Constellations on the new service. Among them Capt. O. P. Jones, who flew the first scheduled East to West service on Monday, July 1st, has more than 2,000,000 air miles to his credit. Capt. W. L. Stewart, who captained the Constellation *Bangor II* in which the author flew to New York on June 23rd, was one of the pilots who opened the North Atlantic return ferry service in 1941 and has since made 161 crossings. On the return flight Capt. L. V. Messenger was the captain; he had made 166 crossings to date.

Most people will be familiar with the route illustrated above, although the distance from Gander to New York—

B.O.A.C. Constellation *Bristol II* prepares to taxy out at La Guardia. In the foreground Mr. Courtenay Edwards and the author discuss the traffic problems at the airport.

"*Flight*" photograph.

A fine portrait of the Constellation *Bangor II* near the Canadian-American border. This aircraft is the one in which the tenth proving flight, the subject of this narrative, was made.

ATLANTIC JOURNEY

1,100 miles—may appear surprisingly long. The time taken for the two ocean legs depends to a great extent on the winds, and the table of scheduled times and actual elapsed times given below indicates quite remarkable agreement.

Due to a minor hydraulic defect, the first take-off from the London Airport was delayed, and a little more time was also lost during the rest of the journey. However, this was a proving flight, and the ground staff at Rineanna and Gander were not at that time completely familiar with the somewhat inconvenient freight-loading arrangements for the Constellations or the paper work involved.

In the week which elapsed between outward and return trips the improvement in organization was sufficient to be immediately noticeable, and is reflected also in the time-keeping on the return flight, in particular the time at Gander and Rineanna between "engines off" and "chocks away." The time from touchdown to take-off is not quoted, for it depends upon several factors beyond the company's control, the chief ones being that B.O.A.C. captains sensibly believe in the need for a very thorough pre-take-off engine run up and check on their new Constellations, and depending upon wind direction, weather and congestion at the airport taxying from the runway and marshalling to the gate may take from five to twenty-five minutes. Efficiency in handling in this case is indicated by the speed and simplicity with which passengers are fed, the freight loaded or discharged, and the paper work dealt with. Overlong delays on the ground obviously not only reduce the greatest advantage of air travel, namely, speed from place to place, but nullify the constant efforts of aircraft designers to find a few more m.p.h. cruising speed.

OUTWARD JOURNEY

LONDON TO RINEANNA

Hours G.M.T.

					hr.	min.
Chocks away	2244	Engines off	0113	Total time	2	29
(Scheduled)	2100			(Scheduled)	2	15
Airborne	2254	Landed	0106	Flight time	2	12—
Set course	2255	Overhead	0030	Time on course	1	35

Static time on ground, 2 hr. 18 min. (Scheduled 1 hr. 15 min.)

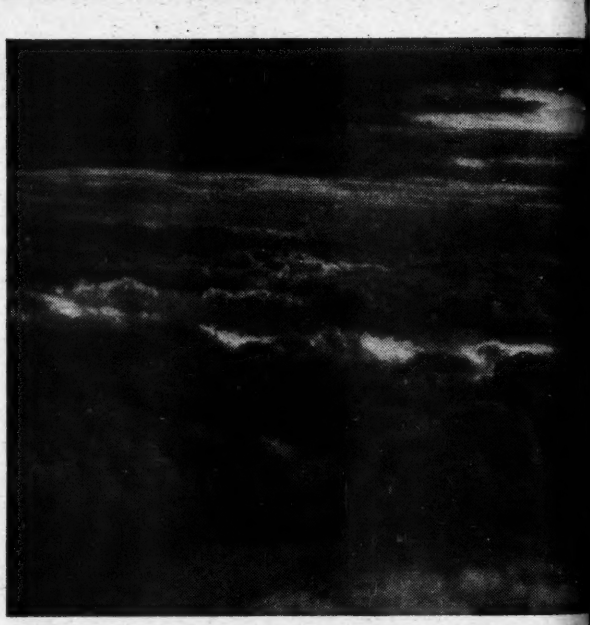
RINEANNA to GANDER

Chocks away	0331	Engines off	1332	Total time	10	01
(Scheduled)	0030			(Scheduled)	9	45
Airborne	0342	Landed	1325	Flight time	9	41
Set course	0346	Overhead	1325	Time on course	9	39

Static time on ground, 2 hr. 9 min.

GANDER to LA GUARDIA

Chocks away	1541	Engines off	2051	Total time	5	10
(Scheduled)	1130			(Scheduled)	5	15
Airborne	1551	Landed	2041	Flight time	4	50
Set course	1551	Overhead	2035	Time on course	4	44



Darkness quickly falls as the Constellation climbs from Gander on its long, ocean flight.

Commentary and Flight Diary

After rushing round London, arranging dollar credit and trying to get a passport renewed and an American visa issued quickly by two hopelessly inadequate and understaffed departments, all requirements were eventually met,

and the checking and weighing-in took place at 7.30 p.m. on Friday, June 21st. However, the flight was cancelled due to bad weather at the intermediate stop in Ireland. It would be quite within the Constellation's capacity to over-fly Rineanna, but this was not in any case desirable on a proving flight, and there is always a possibility in the event of unusually strong headwinds of running uncomfortably close to the fuel safety mark on East to West crossings.

No Pressurising

The trip was postponed again on Saturday night on C.A.B. orders, because of the cabin supercharger trouble affecting all Constellations, but after disconnecting the offending drive during Sunday all seemed ready for departure on Sunday night. Unfortunately the flight had now to be made below 10,000 feet, because the pressurising and conditioning equipment was temporarily out of use. It proved later that this made little difference to the comfort of the flight, although it was less satisfactory from the point of view of weather and aircraft operation. From the time log below it will be seen that take-off was nearly two hours late on Sunday, due to the small hydraulic defect.

When the service has been running for a while and corners have been rounded off it should prove possible to reduce the time between arrival at the Victoria Terminal (7.30 p.m.) and take off (10.00 p.m.). There seemed to be an unwarranted period of delay after examination of documents and passports, and during this time passengers were "held" in a tent by a zealous airport policeman until the scheduled time for embarkation. Numerous B.O.A.C. officials were, however, most helpful and courteous. A providential release from the stuffy tent seemed imminent when a Pan American Constellation started up, but the flapping canvas and guys took the strain.

Time to board arrived at last and after a short taxi and long run up, the Constellation was airborne and the lights of Heathrow were rapidly lost to view.

During preparation for take-off on the Constellation (and the Skymaster) the noises of flap motors and other devices and the sudden dimming and brightening of lighting during engine starting is anything but reassuring to the average passenger; however, taxying and take-off were smooth and reassuring. The noise, even at full power, is not excessive while under cruising conditions a normal conversation can be carried on and the steady drone is quickly forgotten and becomes almost soothing.

The Constellation is quite comfortable and roomy and adequate seat adjustment is provided. Vision through the windows is good in view of the size restriction occasioned by the practical requirements of a pressure cabin, and the uniform neutral colour of the interior is restful to the eyes. The same cannot be said of the main roof lighting, which produces a number of bright and disturbing spots of light.

Personal opinion and something of a compromise govern

RETURN JOURNEY

NEW YORK to GANDER

		Hours G.M.T.			hr.	min.
Chocks away	1826	Engines off	2245	Total time	4	9
(Scheduled)	1830			(Scheduled)	4	20
Airborne	1835	Landed	2241	Flight time	4	6
Set course	1837	Overhead	2237	Time on course	4	

Static time on ground, 1 hr. 33 min. (Scheduled 1 hr. 15 min.)

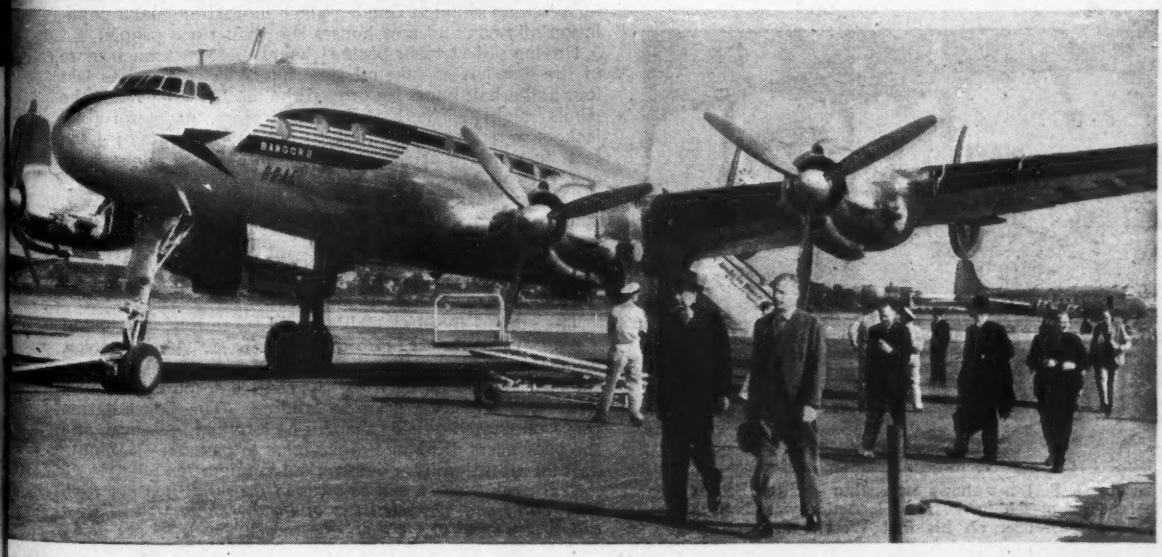
GANDER to RINEANNA

Chocks away	0018	Engines off	0811	Total time	7	53
(Scheduled)	0005			(Scheduled)	7	45
Airborne	0026	Landed	0808	Flight time	7	42
Set course	0029	Overhead	0748	Time on course	7	19

Static time on ground, 1 hr. 24 min.

RINEANNA to LONDON

Chocks away	0935	Engines off	1140	Total time	2	5
(Scheduled)	0905			(Scheduled)	1	55
Airborne	0943	Landed	1135	Flight time	1	52
Set course	0946	Overhead	1130	Time on course	1	44



Passengers who had taken dinner in London on the previous evening, walk in New York's hot afternoon sunshine on arrival at La Guardia Airport.

ATLANTIC JOURNEY

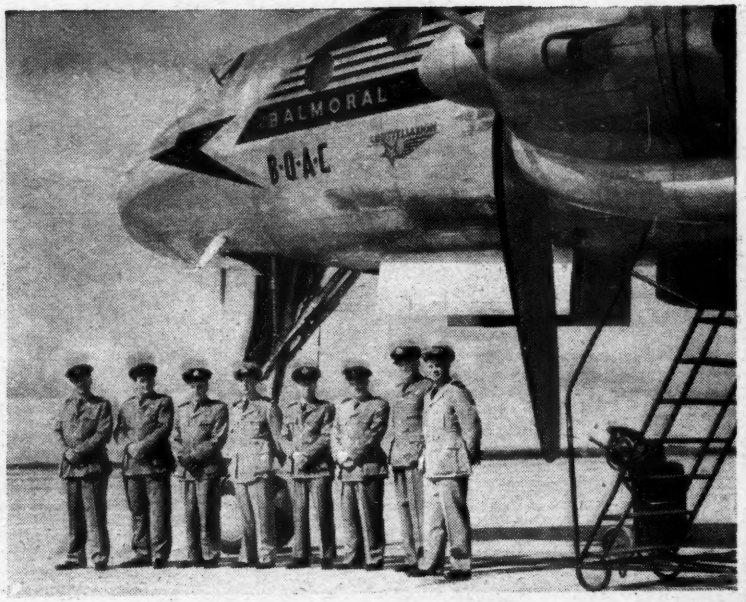
the selection of the best seat position Forward near the engines there is naturally most noise, while to the rear there is rather more vibration. The best compromise seems to be at about row seven. In the cockpit and crew compartment, there is an irritating high-whine from the motor on the auto-pilot, but otherwise it is quite quiet. If, as is planned, a serving hatch is cut in the galley door, this whine will be more audible in the cabin.

From London to Rineanna the altitude averaged 5,500ft and the true airspeed was about 270 kt. On arrival it was necessary to descend through cloud into dirty weather, so some flap was lowered with a characteristic grinding noise, and at about 800 feet in a heavy shower the airfield came into view. After one circuit a very light touch-down was made, and following a prolonged period of taxying the door was opened and the cool, damp air rushed in to revive the passengers for their late supper. After a few words of briefing in the aircraft everyone went into the pleasant airport hotel and enjoyed a meal of steak, and strawberries and cream (second helpings allowed!).

Time for take-off was eventually announced (first in Irish then English) some delay having been caused by the freight and paper work. It is important from the psychological point of view that if a delay is unavoidable passengers should be told at once and given a reason. Dawn was already breaking as the Constellation headed West for Gander with a full fuel load. The weather was unsettled and two weak fronts lay ahead over the Atlantic. Without pressure it would be necessary to fly through or under them and during the climb the de-icers on the leading-edge, operating for exercise, could be seen writhing and pulsing in the dim light.

By 5 a.m. the position was 53.30 N. 15.00 W. and the speed at 6,000 feet was 200 m.p.h. The cabin was comfortably hot but seemed rather dry to the throat.

Most of the passengers, including several young children (the families of B.O.A.C staff at Montreal) slept comfortably for several hours and awoke for a wash and breakfast to find the over-ocean journey nearly completed.



Flown by Captains W. S. May and G. R. Buxton the Constellation *Balmoral* recently flew direct from New York to London in 11 hours 24 minutes. The distance is 3,521 miles and their average speed was 310 m.p.h.

Both air speed and outside temperature rose as the Constellation approached Gander and C.A.V.U. (Clear Air and Visibility Unlimited) conditions were reported. The rather lethargic atmosphere that prevailed was soon dispelled at the thought of the prospective landing in Newfoundland, and the time was passed quickly in talking and spotting icebergs in the clear, blue sea 6,000 feet below.

Dispensing with a preliminary circuit Captain Stewart let down straight on to the wide East to West runway at Gander, and with the minimum of delay passengers were on their way by coach to the present Airlines Mess, a mile or two round the aerodrome. In the Mess, of standard R.C.A.F. pattern, and bringing back many wartime memories, the dazzling whiteness of the new bread occasioned more comment than anything else during the entire trip.

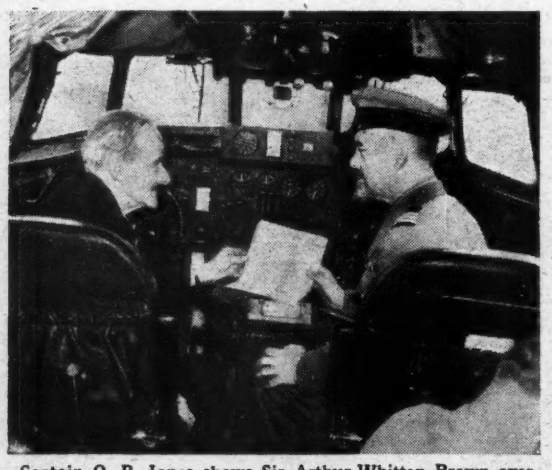
Plans are well advanced to utilise buildings nearer to the arrival point for airline passengers. There is an abundance of accommodation at Gander which in wartime had a population of 7,000 and now houses less than 1,000 people.

Having put watches back 4½ hours there was much more of the day left at take-off time for New York. The last four-and-a-half-hours leg proved the most tiring part of the whole flight. The heat became rather uncomfortable, jackets were already off, and at our height of about 4,500 feet, just on top of the broken cumulus cloud, there were one or two rather bumpy periods.

The problem of initiating Sir Arthur Whitten Brown, who was a passenger, as a Short Snorter caused some lively argument and as one of the two original Short Snorters, he was finally presented with a certified paper facsimile of a bank note for his first crossing and a dollar bill signed by the passengers or his second ocean flight.

The ground speed at Halifax was 236 m.p.h., the height 4,200 feet and the air temperature 17 deg C. After a cooler, steadier stretch over the sea between Yarmouth and Boston, the last leg into La Guardia was completed on E.T.A. and there was no delay prior to landing. The Constellation was soon parked outside the Marine terminal buildings, and the passengers drinking orange juice to pass the 65-minute wait for attention from overworked immigration officials.

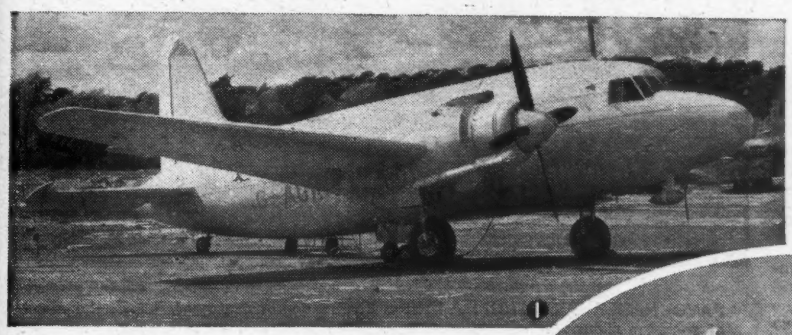
Next week mention will be made of the return journey from New York, and characteristics of the Lockheed Constellation will be discussed in more detail.



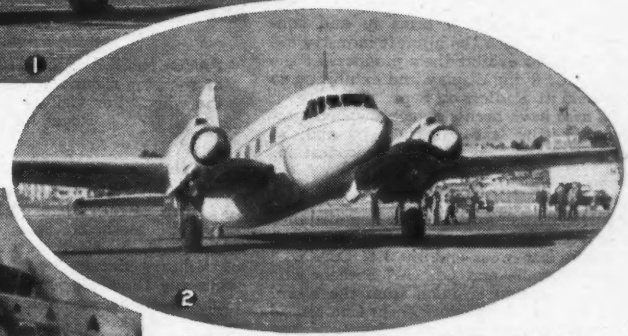
Captain O. P. Jones shows Sir Arthur Whitten Brown over the cockpit of the *Bristol II*. Sir Arthur was about to take off as passenger on his first West to East crossing.

Viking Visits the Norse

Exclusive photographs of a tour of Scandinavia by a demonstration Vickers Viking. As a result of the visit at least five Vikings were sold to the Danes and further business may result. In this modern invasion the story of the ancient Vikings and Danegeld is exactly reversed.

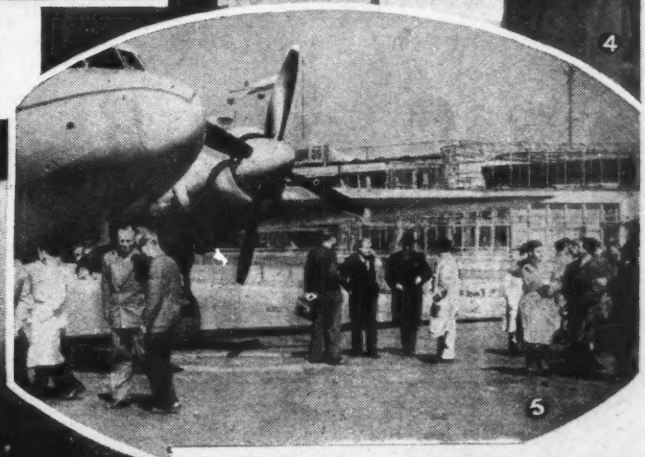


1. Ready for the journey. The Viking, in its resplendent coat of new paint, on the tarmac at Vickers airfield at Wisley in Surrey.



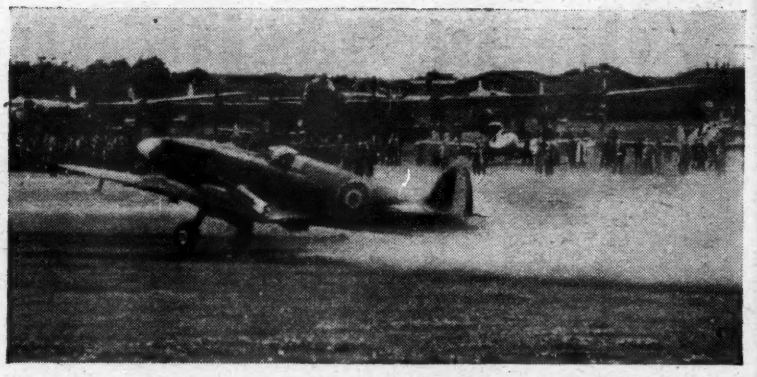
2. Taxying out at Bromma Airport, Stockholm, to fly over the border to Oslo.

3. Airline officials and members of the Norwegian press sample the Viking in the air. **4.** Capt. J. Summers (Vickers Chief Test Pilot) explaining points of the Viking to Mr. J. K. Christie, right, Chief Engineer and Technical Director of Norwegian Air Lines.



5. On the tarmac at Copenhagen Airport. **6.** The Viking flying over Copenhagen with one airscrew feathered lends point to the illustration which appears on our front-cover. As we go to press the news comes from the other side of the world of the safe arrival of the first of 20 Vikings ordered by the Argentine Government.

HERE AND THERE



"Flight" photograph

FAVOURABLE REACTION: A Griffon Seafire demonstrates at R.A.E. the effect of rocket assistance on its take-off run. The solid fuel rockets are visible above the wing. For visitors this exhibition provided an unaccustomed thrill, but to the Royal Navy RATOG is an accepted aid to efficiency.

S.B.A.C. Show

SOME 200 British firms in and connected with the aircraft industry are expected to exhibit their products at the S.B.A.C. flying display and exhibition to be held at Radlett on Sept. 12th-13th.

There have been six such displays previously (the last was in 1937) and, as before, admission will be by invitation.

Sailplane Record

THE British altitude and long-distance records for two-seater sailplanes was broken last week-end by Lt. Cdr. (A.) J. S. Sproule and Lt. (A.) Sothers who flew a German Kranich from the Naval Air Station at Hinstock, near Chester, to Princes Risborough, a distance of 102 miles, and reached a height of 5,600ft.

Viking Vanguard

THE first of 20 Vickers Viking passenger transport aircraft, to the order of the Argentine Government, LV-XEN, reached Buenos Ayres in time to take part in the celebrations of the Argentine National Day of Independence, and was handed over by Major Sairbairn-Crawford on behalf of the aircraft section of Vickers-Armstrongs, Ltd.

The delivery flight was carried out by Wing Cdr. Sir R. Barlow, of Airwork, Ltd., and for the South Atlantic crossing auxiliary tanks were fitted to provide for a still air range of 2,500 miles: the aircraft are powered by Bristol Hercules.

Radar and Air Survey

THE impetus which wartime development of radar had given to modern mapping methods was stressed by Lt. Col. C. A. Hart, of the Directorate of Military Survey at the War Office when the Royal Society's Empire Scientific Conference assembled at Oxford for its third week.

The application of radar to surveying, Col. Hart told the delegates, grew out of the complete lack of ground data and tactical maps in the Far Eastern areas under Japanese occupation. The development would rank in importance with that of air photography and had brought about a complete change in the scientific approach to air survey.

Institute of Transport

AN appeal has been made on behalf of the Institute of Transport by its president, Sir Frederick Handley Page, for an endowment fund so as to provide a proper headquarters and centre for the institute in London. At the moment, some £40,000 has already been promised towards the target of £100,000.

The institute was founded in 1919 and has a membership of 6,500, and, at present, its offices are at 15, Savoy Street, London, W.C.2.

As Sir Frederick rightly pointed out, however, the administration of transport calls not only for a high degree of skill, but also for a high degree of education. The institute, therefore, could provide important educational facilities.

Accent on Air

INCIDENTALLY, the Institute of Transport is now paying increased attention to the air, and better provision for air transport students is being made in the examination syllabuses.

To this end, the Law of Air Transport is to be included in the examinations for graduateship and associate membership, and the details of the Air Transport Economics and Air Transport Operation syllabuses have been revised.

Reorganization

THE National Gas Turbine Establishment, whose formation was announced by Mr. Wilmot in the Commons last April, and to whom the main functions of Power Jets (Research and Development), Ltd., were formally transferred on July 1st, is to take over the latter company's premises at Whetstone and Pyestock.

Dr. H. Roxbee-Cox, chairman and managing director of Power Jets, has been appointed director of the new establishment, and although all research and development work in connection with gas turbines will in future be the responsibility of the new organization, the Power Jets Company is to be kept in being to exploit Government-owned patents in this field.

"Flight" photograph

ASTRAL STUDY: A technical commission of the Royal Canadian Air Force, now visiting the British aircraft industry, watching Mr. Cotes Preedy demonstrate a Gloster Meteor at Moreton Valence airfield. Air Vice-Marshal James, who leads the commission is in the centre by Mr. Eric Greenwood. The portly figure in the foreground on the right is Mr. Fitzgibbon Carse, Gloster's service manager. After the demonstration the commission went on to the Dowty Equipment Co. Ltd., at Arle Court.

Getting the Bird

HAVING developed what is claimed to be "the first bird-proof windshield installation" for the Beechcraft D18C, to meet the new C.A.A. requirements, what could be more natural than to hurl birds at it by way of a test?

This was done in the C.A.A. laboratory at Indianapolis recently, chickens weighing 4 lb each being fired at the screen from a compressed air cannon at various known speeds from under 100 m.p.h. up to 250 m.p.h.

Up to 160 m.p.h. no damage was done to the screen which is composed of a

HERE AND THERE

sandwich of two layers of semi-tempered glass with a layer of Vinyl plastic between. At higher speeds the screen was damaged, with resultant loss of visibility, but it withstood 225 m.p.h. without the bird penetrating.

It only remains to add that the hapless chickens were first killed humanely by electrocution—and that what was left of them afterwards was of no use to Unrra!

GAS TURBINES AND JET PROPULSION FOR AIRCRAFT

By G. Geoffrey Smith, M.B.E.

RECENT official pronouncements stated categorically that the R.A.F. is interested only in jet-propelled fighters for the future and that projected commercial aircraft are being modified and re-developed for turbine power units of either jet or airscrew types.

The publication of a fourth edition of "Gas Turbines and Jet Propulsion for Aircraft" is timely and will meet a definite need for concise and comprehensive information on this epoch-making change in propulsion technique.

First issued in 1942, and also published in the U.S.A., this work was widely adopted as the standard text on the subject by universities, technical institutions and governmental and commercial training establishments. The earlier editions have for some time been exhausted and a new fourth edition, completely revised and extended in scope, is now in the press.

The twenty-one chapters deal with fundamental principles, construction, operation and testing and maintenance of power units. Descriptions of existing British, American and German units and aircraft are supplemented with details of projected future types.

The respective merits of jet and airscrew propulsion and of tailless and all-wing aircraft are discussed and the aerodynamic problems of compressibility effects and boundary layer control are investigated.

Extending to 246 pages, the book is illustrated with more than 200 photographs, drawings, diagrams and curves.

Copies will be available in the course of a few weeks, price 12/6, by post 13/-.

"Flight" Publishing Co., Ltd., Dorset House, Stamford Street, London, S.E.1.

ATHODYD PROPOSAL: Sir Ben Lockspeiser, Director-General of Scientific Research (Air) at the Ministry of Supply, demonstrates a model of a hypothetical supersonic aircraft. It will be gathered from the shape of the fuselage that the power plant is an athodyd. Under-wing launching rockets can be seen. Studying the model are Air Chief Marshal Sir Alec Coryton (left) and Mr. Arthur Woodburn, M.P. Parliamentary Secretary to the Ministry of Supply.

News in Brief

PASSENGER and troop-carrying aircraft of the R.A.F., states the Air Ministry, flew 45,000,000 passenger-miles during May without an accident involving death or injury.

* * *

The Society of Licensed Aircraft Engineers has now obtained permanent offices at Finsbury Circus House, Bloomfield Street, London, E.C.2 (Tel.: London Wall 6356).

* * *

Suppressed by the Nazis at the time of the *Anschluss*, the Austrian trade journal *Auto Moto Service*, which covers motoring and aviation matters, has resumed publication after a lapse of eight years.

* * *

The Busk Studentship in Aeronautics, founded in memory of Edward Teshmaker Busk who was killed in 1914 while flying an experimental aircraft, has been awarded for the year 1946-47 to Richard Peter Boswell, of Hawker Aircraft, Ltd.

* * *

Sir Frederick Handley Page was elected president of the Royal Aeronautical Society for 1946-47 at the June council meeting, and Sir Oliver Simmonds, Dr. H. Roxbee Cox and Mr. N. E. Rowe were elected vice-presidents for the same period.

* * *

An exhibition embracing all aspects of engineering components relating to mechanical, electrical, optical, scientific, and marine instruments, tools, etc., is to be staged in the Kelvin Hall, Glasgow, from November 15th to 27th, and will be open from 10 a.m. to 8 p.m. daily.

* * *

The B.O.A.C.-Qantas "Kangaroo" air service between Britain and Australia is likely to justify its title quite literally, for it is expected that two kangaroos required by the Moscow zoo will be flown to England by this service, on their way to the Russian capital.

* * *

Mr. Henry C. Watts has resigned his executive position and directorship of the Airscrew Coy., Ltd., and Jicwood, Ltd. Mr. E. R. Mainwaring, a director and secretary of the Airscrew Coy. has also resigned.

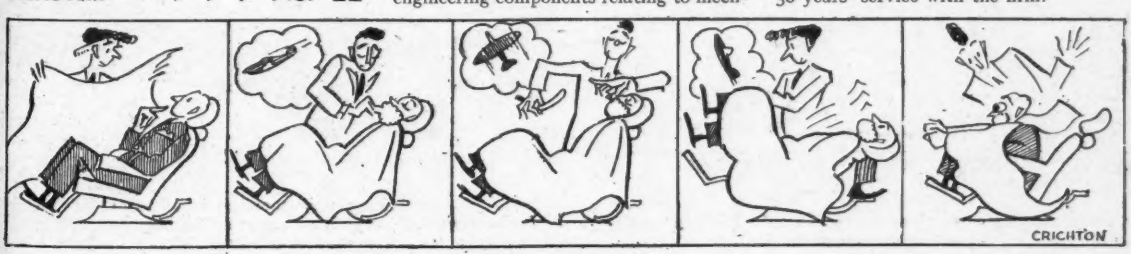
* * *

Specialloid, Ltd., has formed a Canadian subsidiary company—Specialloid (Canada), Ltd.—for the production of pistons for all types of engines operating in the Dominion, and a modern factory has been laid out at Montreal.

* * *

Mr. J. C. Bayley has succeeded his father, Mr. J. Bayley, whose assistant he has been for many years, as the Midland area representative of Ransome and Marles, at 41, Bristol Road, Birmingham. Mr. J. Bayley retires after nearly 50 years' service with the firm.

AIRSTRIP . . . . No. 22



Transonic Research

Details of the Vickers Rocket-Propelled Model for Investigating Sonic Speed Flight

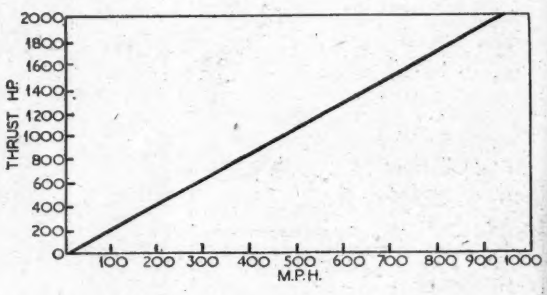
SPACE limitations last week precluded our dealing with the Vickers rocket-propelled research model beyond a brief mention of its inclusion in the R.A.E. display at Farnborough. Now, by courtesy of the Director of the Royal Aircraft Establishment, we are able to give a detailed account.

As initially stated, this Vickers model is based on the Miles M.52 design to specification E 24/43, and is, in fact, a 0.3 scale version of the M.52. There is a sonic flight research programme calling for 24 experimental flying models, of which the first six will be to this described design, although, of course, any details are liable to modification in the light of events.

The model is a light steel cylindrical shell with nose and tail cones, and is fitted with a wooden wing, tailplane and fin. Main dimensions are: overall length, 11.83ft; diameter, 18in; span, 8.1ft. A table of data is included on page 38.

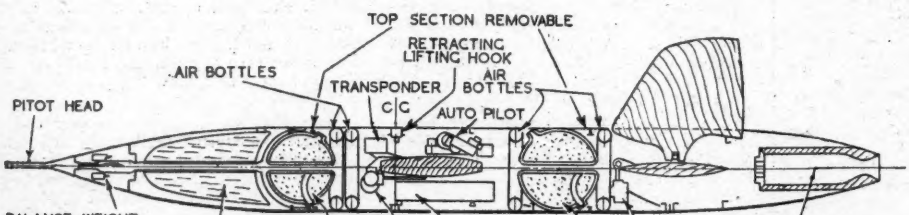
The interior of the body is packed with fuel tanks, air bottles, radio and radar equipment, auto-pilot, servo actuators and, in the extreme tail, the surprisingly small rocket combustion chamber. Reference to the sectional drawing will show the disposition of the various components.

Power is supplied by a bi-fuel rocket, the fuels being



Gradient of equivalent thrust horsepower delivered by rocket motor, plotted against speed.

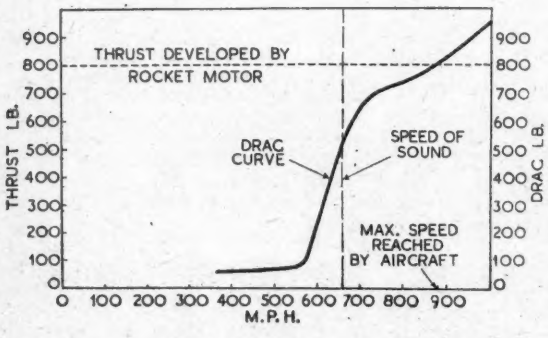
toroidal bottles, the air being delivered to the tanks through a reducing valve. The combustion chamber is a light steel cylinder about 18in long by 6in diameter, with a coned open end, and is lined with a ⅜in wall of carbon cemented to the shell with a special ceramic paste. In the cone end the carbon is swollen in thickness to provide a venturi-profile ejector-nozzle, the nozzle throat diameter being about 1½in and the mouth diameter about 3½in, whilst the length from minimum throat diameter to the mouth is approximately 4in.



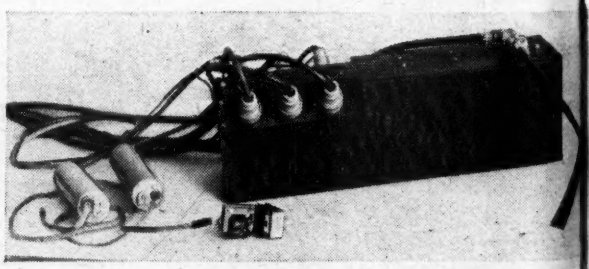
Section through model showing disposition of main units housed in the body, together with relative positions of wing, tailplane and fin.

The C- and T-Stoff are piped to three equi-spaced radially disposed injector nozzles in the combustion chamber end-wall, the C-Stoff being injected axially, with the T-Stoff injected co-axially surrounding it. When these two liquids come together spontaneous combustion takes place, but the exact proportion of the fuels one to the other, and the degree of atomization, is extremely critical in its effect on the performance obtained. The theoretical optimum fuel ratio is 0.36 of T-Stoff to 1.0 of C-Stoff by weight, but the actual ratio achieved is about 0.3:1. Actual temperature rise is 1,750 deg. C, and the

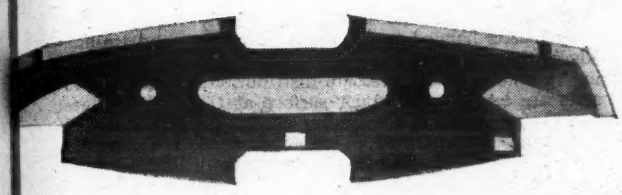
7½ gallons of C-Stoff (57 per cent methyl-alcohol, 30 per cent hydrazine-hydrate, 13 per cent water) and 12 gallons of T-Stoff (approximately 80 per cent hydrogen-peroxide and 20 per cent water) which are carried in three cast stainless-steel tanks, and are fed to the combustion chamber by compressed air stored at 515 lb/sq in. in three



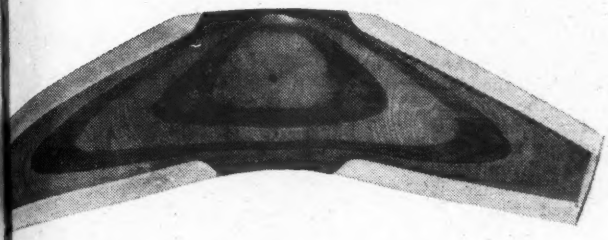
Curve showing rapid rise in drag at transonic flight speeds, and the equivalent thrust.



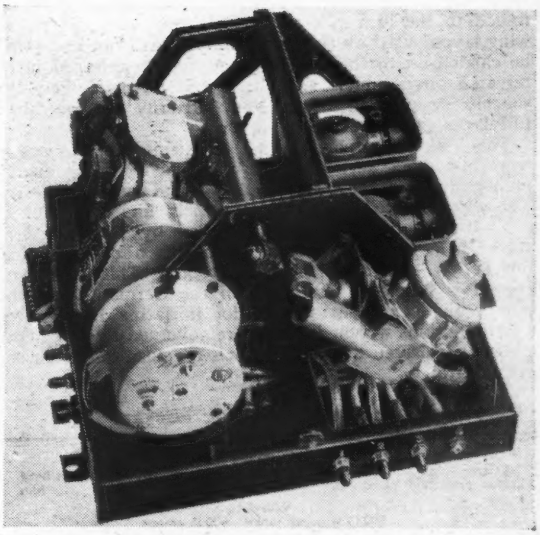
Detail of telemetering unit showing input leads for the six measurements, and (right) how metal leading edge of wing is used as an aerial.



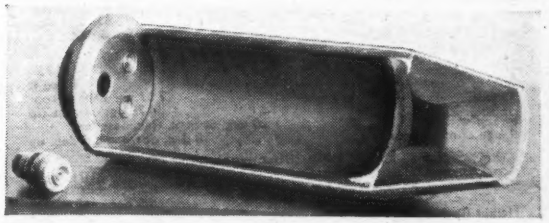
Detail of main wing showing plan-form, aileron cut-outs, armoured edges and strengthening inserts.



Plan view of tailplane showing relative sweep-back and armoured edges.



V-1 type autopilot comprising (top left) position control gyro ; (bottom left), clock ; (top right) pitch control gyro ; (middle right) roll control gyro ; and (bottom right) altitude control unit.



Section through combustion chamber illustrating disposition of fuel nozzles (single nozzle at left), carbon lining, and formation of ejection nozzle.

specific thrust attained 180 lb/lb fluid/sec. Fuel consumption is 17.2 lb/hr/lb thrust and, for the fuel carried, this gives a total thrust of 800 lb.

In use, the model will be carried up to 36,000ft slung beneath a Mosquito, which will then release it and break away rapidly. The model is slung by a single-point suspension on the c.g. line, which is spring-loaded to retract flush with the skin surface. On release the autopilot takes over and puts the model into a 10 deg dive for 15 sec—which means a drop in altitude to about 35,000ft—after which it is levelled out. At this point a bursting diaphragm releases the compressed air from the bottles, and the fuels are fed to the combustion chamber to give the required thrust. This accelerates the model up to sonic speed in 18 sec, beyond which it continues to accelerate up to its maximum of 880 m.p.h. (1.3 Mach number at 35,000ft) which is reached in a total time of 70 sec. When this speed is reached, the fuel is exhausted and thus the power is "switched" off; the model then decelerates to subsonic speed and the autopilot locks the tailplane down so that the device dives into the sea.

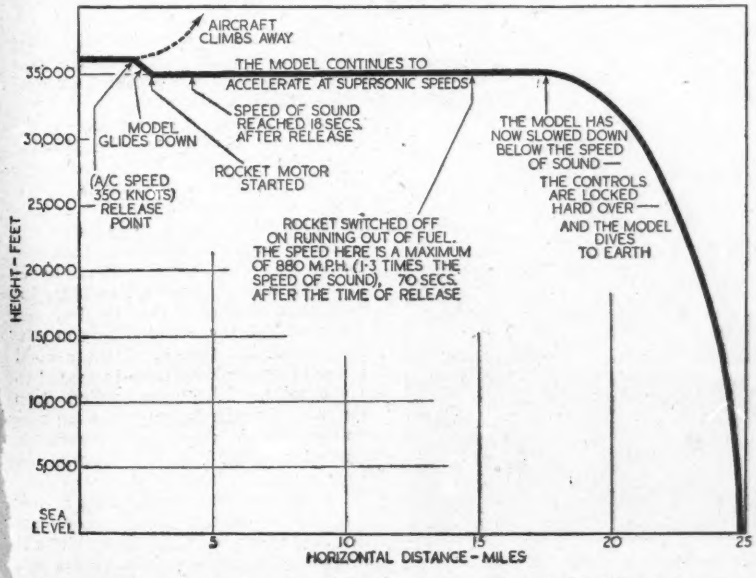

AIRCRAFT CLIMBS AWAY
THE MODEL CONTINUES TO ACCELERATE AT SUPERSONIC SPEEDS
SPEED OF SOUND REACHED 18 SECS. AFTER RELEASE
MODEL GLIDES DOWN
ROCKET MOTOR STARTED
(A/C SPEED 350 KNOTS) RELEASE POINT
ROCKET SWITCHED OFF ON RUNNING OUT OF FUEL. THE SPEED HERE IS A MAXIMUM OF 880 M.P.H. (1·3 TIMES THE SPEED OF SOUND), 70 SECS. AFTER THE TIME OF RELEASE
THE MODEL HAS NOW SLOWED DOWN BELOW THE SPEED OF SOUND —
THE CONTROLS ARE LOCKED HARD OVER —
AND THE MODEL DIVES TO EARTH
HEIGHT - FEET
35,000
30,000
25,000
20,000
15,000
10,000
5,000
SEA LEVEL
5
10
15
20
25
HORIZONTAL DISTANCE - MILES

Chart of flight path showing sequence of events from release to final dive into sea.

It does not matter very much that the model is expendable, since measurements of dynamic pressure, static pressure, normal acceleration, longitudinal acceleration, combustion chamber pressure, and tailplane angle are fed into a six-channel telemetering transmitter which emits the respective signals for reception at a ground station. At the same time a unit called a transponder receives a signal from a ground station and retransmits it on a different frequency to facilitate tracking by radar. By these means a complete picture of what is happening during the model's flight through the sonic speed range may be built up. It should be remembered that this information cannot be derived from wind tunnel experiments due to the tunnel "choking," and physical flight research such as provided by this Vickers model is the only means whereby effects in this critical speed region can be ascertained. The initial flight trials are expected to take place in November this year.

Although since the results of German high-speed flight researches became available we have grown accus-

tomed to the idea of swept-back wings, etc., the normal wing layout used on the Vickers model will not necessarily be carried on to the remaining 18 types envisaged in the research programme. In fact, it is more than likely that sharply swept-back wings, and butterfly or swept-back tailplanes, will rule the day.

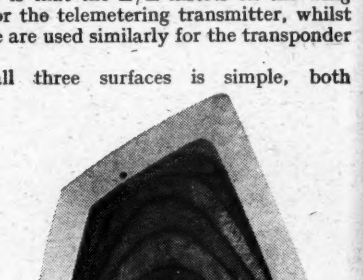
The Vickers supporting and stabilizing surfaces are all true bi-convex sections, the wing being of laminated mahogany, and the tailplane and fin of laminated birch. The wing is fitted with ailerons which, like the tailplane, are actuated by a servo unit driven by compressed air stored in a separate toroidal air bottle, and the controlling action is governed by the autopilot. This latter component is based on that used in the German V.1 flying bomb, and comprises a clock for initiating the required control actions which, in turn, are governed by three compressed-air-driven gyros—one each for position, pitch and roll control.

VICKERS TRANSONIC ROCKET

Fuselage	
Length	11.83ft over pitot head. 10.99ft minus pitot head
Max. diameter	18in
Weight	
800 lb with full tanks. 500 lb empty	
Wing (Bi-convex)	
Area	9.8 sq ft
Aspect ratio	5.1
t/c ratio	7.5 per cent, root 4 per cent, tip
S.M.C.	18.936in
Incidence	0 deg. 33 min.
Dihedral	2 deg.
Aileron area	63 sq in each
Aileron range	9 deg. up, 6 deg. down
Tailplane (Bi-convex)	
Span	4.78ft
Area	3.3 sq ft
t/c ratio	7.07 per cent at root 4.75 per cent at tip
Sweepback	20 deg. at max. thickness line
Range of movement	8 deg. down and 5 deg. up
Fin (Bi-convex)	
Area	1.715 sq ft
t/c ratio	7.5 per cent at root 4.5 per cent at tip
Height from fuselage axis to tip	26in
Angle of rake	7 deg.

Wing, tailplane and fin all have finely profiled light-alloy inserts bonded to the wood at leading- and trailing-edges, these inserts being about 2in wide. It is interesting to note that, for pressure distribution reasons, the inserts are let into the upper surface at the leading-edges, and the underside at the trailing-edges. Other metal plate inserts are incorporated in the mainplane, spanning the centre-section and at each tip, for strengthening purposes. An ingenious feature is that the L/E inserts on the wing are used as aerials for the telemetering transmitter, whilst those on the tailplane are used similarly for the transponder unit.

Attachment of all three surfaces is simple, both the wing and the tailplane being single-piece units which pass through the body of the model. The wing is rigidly fixed, and the aileron operating linkage is taken from the servo unit and carried out to each aileron through a tunnel in the wing. Conversely, the tailplane is pivotally anchored so that its servo unit can alter the angle of attack as required for elevator effect. The fin is, of course, rigidly fixed as a stabilizing surface and is arranged with its line of maximum thickness (at 50 per cent chord) raked back 7 deg from the vertical.



Elevation of fin illustrating the low aspect ratio, anchorage crutch, and armoured edges.

Notes from Farnborough

Further Observations on Developments Shown at R.A.E.

TECHNICAL journalists found that the assembly at Farnborough of Britain's newest aircraft and of research models and drawings demanded detailed study but permitted only condensed discussion. Accordingly, it is proposed to amplify last week's report with some notes and comments on the more significant exhibits. One of these which was widely discussed, the Vickers transonic research model, is fully described above.

Compactness and cleanness of design characterise the Hawker Fury I with Napier Sabre VII engine. The top speed is 465 m.p.h. at 20,000 feet.

Of the military machines one of the newest and fastest was the Hawker Fury I fighter with a Napier Sabre VII engine. For sheer cleanness, compactness and ingenuity of design this prototype has few equals. The Sabre VII (specific weight 0.83 lb/h.p.; specific power 83 b.h.p./litre) has methanol injection and a wing-root radiator installation, similar to that tried on the Tempest. A top speed of 465 m.p.h. at 20,000ft is claimed and the normal range of 450 miles can be increased to 1,500 miles with two 90-gallon drop tanks. Standard armament is four 20-mm Mk. V guns and provision is made for a Mk. VIII R/P installation or two 1,000 lb bombs.

As the Americans are already claiming that a special Thunderbolt has attained over 500 m.p.h. in level flight it would be interesting to see what this new variant of the Fury, the Supermarine Spiteful, de Havilland Hornet

NOTES FROM FARNBOROUGH

or the Martin Baker F18/39 could achieve in racing condition.

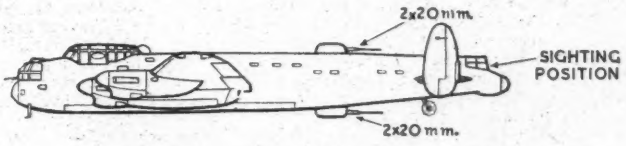
On the rare occasions when the Martin Baker could be spared for demonstration this cleverly designed, Griffon-engined, prototype has always attracted favourable comment. Reference was made last week to its slow-flying qualities, but these have not prejudiced high-speed performance: at 20,000ft the Griffon 83 gives this 11,500 lb machine a speed of 460 m.p.h. Throttled to 225 m.p.h. a range of 1,200 miles is attainable.

In the design of the new Short Sturgeon two-seat naval deck-landing reconnaissance aircraft, speed has been subordinated to other qualities; even so the "over 300 m.p.h." placard displayed near this twin-Merlin shoulder-wing monoplane must have been "vetted" by a particularly reticent member of the Silent Service. No doubt the compact battery of three cameras will be supplemented by the latest radar equipment.

"Flight" photograph.

A Griffon-Seafire on one of the R.A.E. accelerators. Launching speed is 73 m.p.h. and the acceleration run 65 feet. The two tow ropes are 1½ inches in diameter.

Students of military aircraft were impressed by the R/P and torpedo-laden Bristol Brigand torpedo-fighter Mk. I—not a flashingly spectacular type, but obviously combining a superior performance with the characteristics which made the Beaufighter so popular. The Brigand is equipped for dive-bombing and has an even wider field of application. It is difficult to realize that this well-proportioned machine weighs nearly 40,000 lb, and that without torpedo it attains 365 m.p.h. at 12,000ft. High speed at low and medium levels is of great importance in an aircraft of the Brigand's class, and is made possible by the characteristics of the Centaurus 57 engines. With torpedo the range is 2,200 miles, but this can be increased to 3,200 miles with wing overload tanks.



An experimental Lancaster has two barbettes, each with two 20 mm. guns, controlled from a tail position.

Performance and armament data for other military types was quoted at R.A.E. with comparative freedom. The following are of particular interest:

Hamilcar Mk. X.—Two Mercury 31 engines. All-up weight 47,000 lb. Speed 130-150 m.p.h. Army load 17,500 lb.

Hastings C Mk. I.—Four Hercules 101 engines. All-up weight 75,000 lb. Maximum speed 343 m.p.h. at 21,500ft. Range 2,850 miles. Load 9,300 lb.

Lancaster ASR Mk. III.—Four Merlin 28, 39 or 224. All-up weight 68,000 lb. Range 2,200 miles. Carries airborne lifeboat Mark IIA.

Meteor F Mk. IV.—Two Derwent V gas turbines. Maximum speed 585 m.p.h. at sea level. All-up weight 14,000 lb. Maximum range with drop tanks 1,270 miles. Bomb load 2 × 1,000 lb.

Mosquito NF Mk. 36.—Two Merlin 113/114. All-up weight 23,500 lb. Speed 397 m.p.h. at 25,000 ft. Range 2,110 miles. Bomb load 1,000 lb.

Prentice Mk. I.—Elementary trainer. One Gipsy Queen 31 or 51. Weight 3,850 lb. Maximum speed 170 m.p.h. at 6,500ft. Estimated range 480 miles at 140 m.p.h. at 5,000ft.

Queen Martinet Mk. I.—Radio-controlled pilotless target aircraft. One Mercury XXV. Weight 6,750 lb. Range 600 miles at 110 m.p.h.

Seafang 32.—One Griffon 89. Weight 10,574 lb. Maximum speed 447 m.p.h. at 25,000ft. Bomb load 2 × 1,000 lb.

Seaford.—General reconnaissance flying boat. Four Hercules XIX. Weight 78,000 lb. Maximum speed 210 knots. bomb load 2,000 lb. Armament two fixed 0.303 guns in bow, two 0.5 guns in bow turret, two 20 mm guns in mid turret, two 0.5 guns in stern and two 0.5 side guns.

Sea Hornet Mk. XX.—Long-range Naval fighter. Two Merlin 130/131. Weight 18,226 lb. Speed 400 knots at 18,700ft. "Combat" range with two 100-gallon tanks, 1,120 sea miles at 236 knots. Bomb load 2 × 1,000 lb. R/P load 8 × 60 lb.

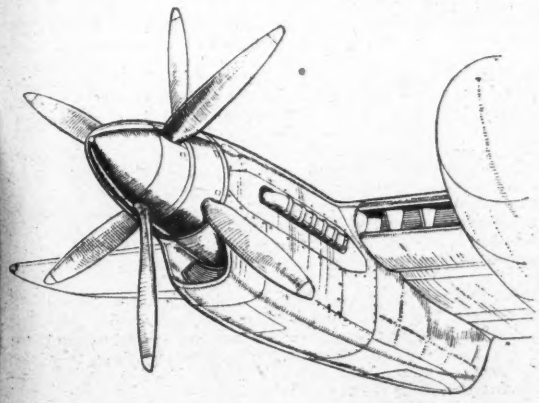
Sea Otter ASR Mk. II.—Amphibian flying boat. One Mercury 30 engine. Weight 9,250 lb. Speed 133.5 knots. Range 726 sea miles.

Spiteful XIV.—One Griffon 69. Weight 10,200 lb. Maximum speed 475 m.p.h. at 26,000ft. Bomb load 2 × 1,000 lb.

Spitfire 24.—One Griffon 61. Weight 10,150 lb. Maximum speed 460 m.p.h. Range without drop-tanks 860 miles. Bomb load 3 × 500 lb.

Tempest VI.—One Napier Sabre Va. Weight 12,275 lb. Maximum speed 436 m.p.h. at 14 000ft. Range 470 miles 1,200 miles with 2 × 45-gallon drop tanks). Bomb load 2,000 lb. R/P load 4 × 305 lb.

By some it was noted with concern, by others with doubt, that the programme credited the Seafang 32 with a range, without drop tanks, of 276 miles, whereas the quotation for the Spiteful XIV in the same condition was 890 miles. Again,



Close spacing of the Merlin engines is one of the advantageous features of the Short Sturgeon for carrier operation. The airscrews are contra-rotating Rotols.

NOTES FROM FARNBOROUGH

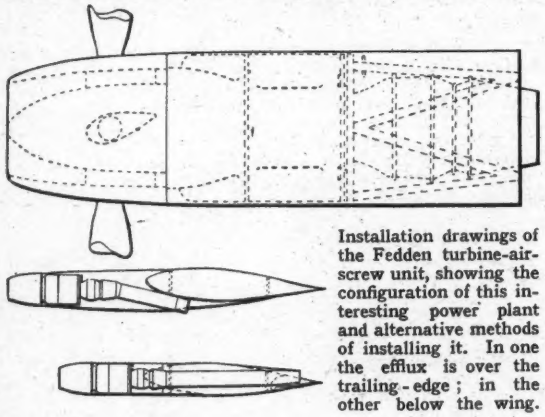
the speed of the Hornet III fighter was listed as only 450 m.p.h., whereas we are assured by the manufacturers that the hitherto published figure of 470 m.p.h. remains valid.

According to other figures issued at R.A.E. the Spiteful XIV with its speed of 475 m.p.h. at 26,000ft. is the fastest of all British airscrew-driven types. It may be wondered why it was necessary to develop the Spiteful—an entirely new aircraft—when the Spitfire 24 achieves only 15 m.p.h. less, carries the same armanent, and has roughly the same range.

Doubtless the apparent discrepancies in the programme can in some cases be explained by omission to quote conditions, but it is regrettable that the characteristics of all aircraft —certainly the military types—could not have been tabulated according to a standard set of conditions.

Of the scale-model aircraft exhibited, the most striking was perhaps the Miles M.52 built to specification E24/43. The most daring departure is the use of an annular intake to the special Power Jets gas turbine; this intake is located to the rear of a sharp nose cone in which the semi-reclining pilot is accommodatel, feet forward. The cone can be ejected in emergency and landed by parachute.

The idea of using an annular intake on a jet propelled aircraft is not entirely new. Campini had early patents cover-



Installation drawings of the Fedden turbine-airscrew unit, showing the configuration of this interesting power plant and alternative methods of installing it. In one the efflux is over the trailing-edge; in the other below the wing.

ing this feature and it has been reported that a Russian fighter has a similar arrangement, though in this case the nose cone houses the guns, the pilot being seated well aft in the main fuselage.

Equally ingenious in its way is the power plant layout of the Saunders-Roe jet propelled fighter flying boat with two Metropolitan-Vickers axial-flow units in the sides of the hull fed from a single intake high in the bow. It will be interesting to see what effect the jet efflux has on the hydrodynamic qualities of this aircraft. The planing bottom extends almost the whole length of the hull.

It was made clear during the war that efficient freight aircraft must be of highly specialized design, provided with adequate loading as well as stowage facilities, and it was interesting to learn that Airspeed have received an order for the AS 60, a high-speed military transport development of the Ambassador, and incorporating a particularly ingenious scheme for quick loading and discharging. The bottom line of the fuselage sweeps up in a very pronounced curve to the tail, and this lower curved portion comprises two very large clam-shell doors which hinge upward, permitting large vehicles to be driven up the short ramp attached to the fuselage floor forward of the doors.

Intermediate power-plants, between the highly developed piston engines and the straight jets, were the Armstrong Sidderley Python, Bristol Theseus and Rolls-Royce Trent gas turbines driving airscrews. It was noted that Bristols refer to the Theseus as a 2,000 h.p. unit. Specifically the power figures are 1,950 b.h.p. + 500 lb jet thrust (I.C.A.N. sea-level static conditions), 2,350 equivalent b.h.p. (sea level, 300 m.p.h.) and 1,500 equivalent b.h.p. (20,000ft. at 300 m.p.h.). Under maximum power sea level conditions at 300 m.p.h. the fuel consumption is 0.57 lb/equiv.b.h.p./hr.

Power figures for the projected Fedden turbine-airscrew unit were published last week. Installation drawings issued by the company show that this promising unit measures 7.75ft from the mounting points to the tip of the spinner, and that the overall installed diameter is 27 inches.

The Farnborough exhibition provided an opportunity to collect data on some items of service equipment, notably on deley Ppthon, Bristol Theseus and Rolls-Royce Trent gas turthe cordite-operated accelerator, from which a Seafire was launched, is capable of handling machines of up to 16,000 lb. The maximum launching speed is 64 knots (73 m.p.h.), acceleration run 65ft and buffer stroke 5ft.

The rocket-operated catapult, likewise demonstrated, will launch aircraft of up to 10,000 lb at 75 m.p.h. The acceleration stroke is 70ft and the buffer stroke 2½ft. Sixteen or eighteen 3in rocket motors give a thrust of 40,000 lb.

FREDERICK KOOLHOVEN

ALL those who were connected with aircraft design and manufacture during the "hard" inter-war years, will learn with regret of the death, on July 1st, of Frederick Koolhoven at the age of sixty years. The modern generation may remember the original and, for their time, extremly efficient aircraft built by the Koolhoven concern in Holland during that period. For others he was probably best known for his design work both during the first European war with Armstrong Whitworth's and in the earlier peace years with British Air Transport. One of the most notable early civil types was the BAT FK-27, while another of his outstanding designs of the time was the BAT Bantam fighter.

Frederick Koolhoven learned to fly in the 1910-11 period, on a Farman, and came over to this country two years before the first European war.

THE WAYFARER LOSS

AS part of the series of demonstration flights planned by the Bristol Aeroplane Company, and outlined in the issue of June 27th, the first production Wayfarer left on June 28th on its flight to South America. In charge were Mr. E. H. ("Biffy") Newman, of Airwork; Ltd., and Mr. R. Ellison, one of the Bristol Company's test team.

Everything went well during the first stages of the flight to Buenos Aires, but unfortunately—and owing, it is understood, to the failure of the radio compass—the Wayfarer had to be "ditched" during the South Atlantic crossing. The aircraft was 400 miles off course before the error was discovered and, at the moment of ditching, had been in the air for 15¼ hours—much over the period required for the 1,840-mile run. To provide the necessary range the Wayfarer had been fitted with three 300-gallon overload tanks which should normally have provided an ample margin.

FOUR FAMOUS MEN

FOUR men whose work made valuable contributions to the advance of aviation as well as to the technical development of the motor car were among the names selected for tribute at the recent quadragenary celebrations of the Institution of Automobile Engineers held in the premises of the Society of Motor Manufacturers and Traders at 148, Piccadilly, London, W.1.

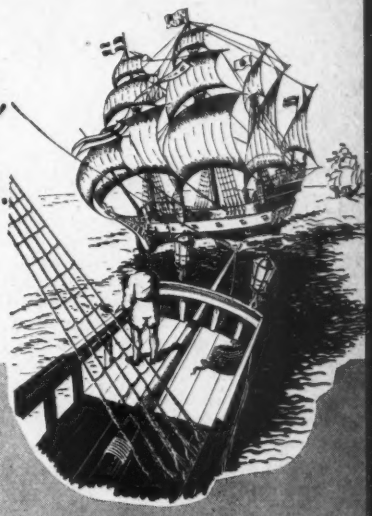
The first tribute was paid by the Institute's senior living past-president, Lt. Col. T. B. Browne, to the late Dr. F. W. Lanchester who died in March of the present year when his life's work was reviewed in *Flight*. Col. Browne sketched the career of this famous engineer and scientist and pointed out that he began his study of aerial flight in 1893, was the first person to lay down the basic theories of flight, and always regarded his work on the automobile as a stepping stone to aeronautical development.

The late Montague S. Napier's contribution to automotive engineering and aviation was outlined by Major E. G. E. Beaumont who said that he produced the first six-cylinder car in 1903, and the firm bearing his name began production of aircraft engines in 1919. Napier himself had already turned his attention to the advancement of the aircraft engine when he went to live in the South of France, for health reasons, in 1911.

That the late Sir Henry Royce began his career in railway engineering, put in a spell among machine tools, and then worked for nearly 25 years in electrical engineering before turning his attention to motor cars was probably news to many who listened to Mr. A. G. Elliott's tribute to the man responsible for the Rolls-Royce car and aircraft engine.

Finally, Dr. H. R. Ricardo, whose work in the development of the internal combustion engine has led to many important developments, was paid a tribute in a speech by Major A. T. Evans.

In the great days of the Tudors, Britain bridged the seven seas. Now 'Tudors' lead again....



A. V. ROE & CO., LTD., MANCHESTER, ENGLAND (Branch of Hawker Siddeley Aircraft Co. Ltd.)

a superplane by

AVRO

It was in Tudor days that British enterprise laid the foundations of her world sea traffic. Today an Avro aeroplane proudly bears the great name of Tudor and will be a worthy upholder of the Avro tradition of service on the airways of the world. The fuselage accommodation of the Tudor II varies to meet particular operators' requirements—from 60 seats down to 40—according to the range and layout decided upon. With an economical cruising speed of 235 m.p.h. and a top speed of well over 300 m.p.h., passengers travel in the greatest possible comfort in the fully pressurised cabin, efficiently heated and air-conditioned.

THE AVRO TUDOR II

Four Rolls-Royce Merlin engines

Handling Air Cargoes

Saving Time on the Ground is the Basic Requirement : Some of the Problems Involved : Special Equipment

By N. D. RYDER

A VERY important phase of the business of transporting goods by air is the actual handling of air cargoes—the job of getting them into and out of the aircraft, the stowage, and the anchorage during flight.

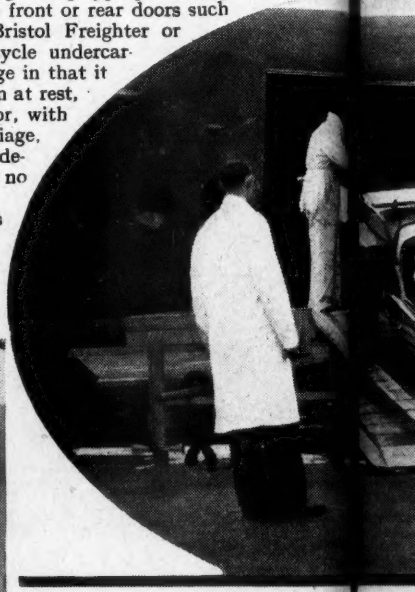
The cargo-handling problem, like many others, is necessarily approached with the fact in mind that speed is the first consideration. This was stressed in an article by M. B. Crawford, chief equipment engineer for United Airlines, in the April issue of our associate journal, *Mechanical Handling:* "Time is what we are selling," is how he put it, and this saving of time *on the ground* is the controlling factor in designing containers which can be moved easily and quickly, and such equipment as belt loaders, cranes, chutes, and other impedimenta with which to move them.

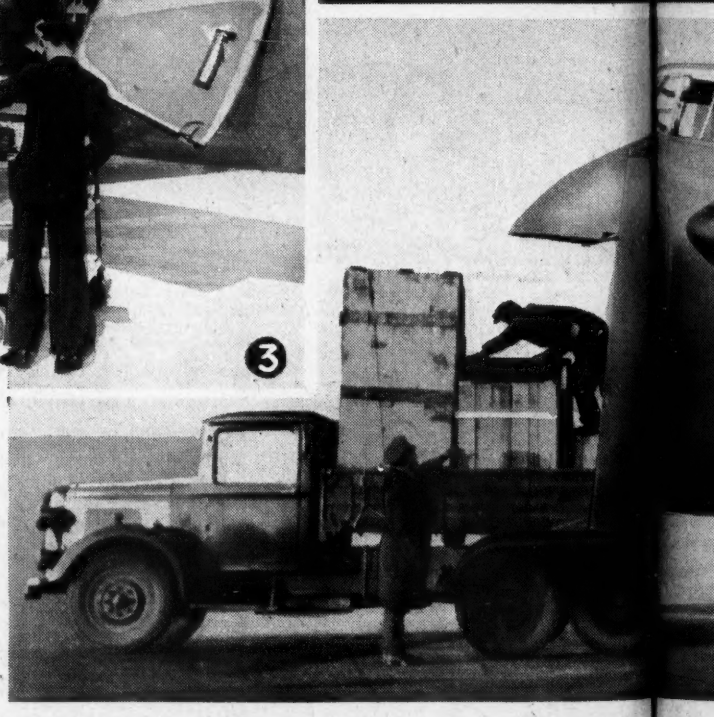
Variety in the design and dimensions of aircraft add to the complexity, and the problems are apt to be further complicated from the time-saving angle in the case of aircraft which carry both freight and passengers because there is generally less elbow room in which to handle the cargo than in an out-and-out freighter, while at the same time the passenger (who is also paying for speed) resents being delayed on the ground while items of freight are being handled.

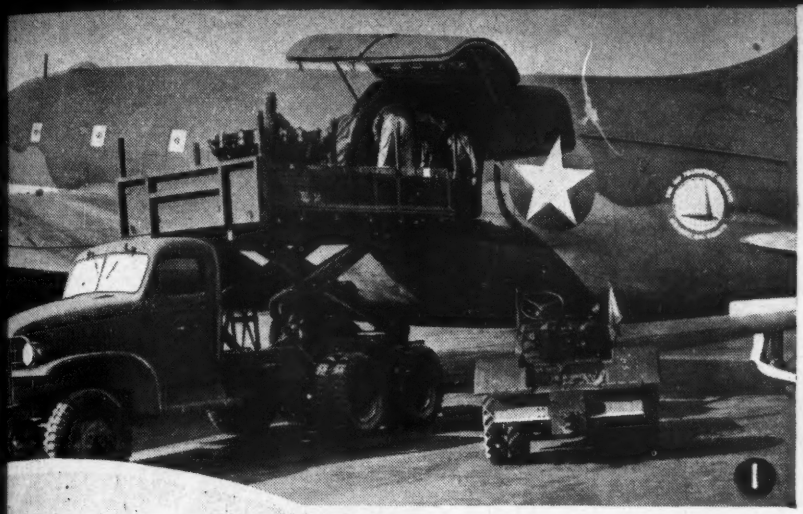
Imagine, for example, the business man who has booked a passage from A to B. The aircraft puts down at an intermediate point, and passengers joining or leaving her here will keep her on the ground for, perhaps, five minutes. If, however, this period is increased to, say, 20 minutes in order to unload one or more bulky and heavy items of cargo and take on, stow, and secure other freight, then the passenger will probably feel that he is not getting the full benefit of the extra speed for which he has paid. This, of course, is not only an argument in favour of special equipment for quick cargo handling; it is an even stronger argument in favour of all-passenger and all-freight aircraft, especially over comparatively short distances.

Obviously, then, aircraft designed from the start primarily for cargo work present fewer handling problems than such otherwise excellent types as the DC-3 which was evolved with passenger-carrying foremost in view. It is now generally agreed that the maximum ease of handling goods is provided by a high-wing type permitting a low loading platform with front or rear doors such as the Miles Aerovan, Bristol Freighter or Fairchild Packet. A tricycle undercarriage is an added advantage in that it results in a level floor when at rest, though the Freighter's floor, with conventional undercarriage, has a slope of only a few degrees, which should offer no handicap in practice.

Such types are always fitted with entrances of maximum size, and often have some kind of built-in ramp which can be







(1) A C-46 Commando being loaded from a special lorry whose platform is raised on the lazytongs system to the high-level "goods entrance."

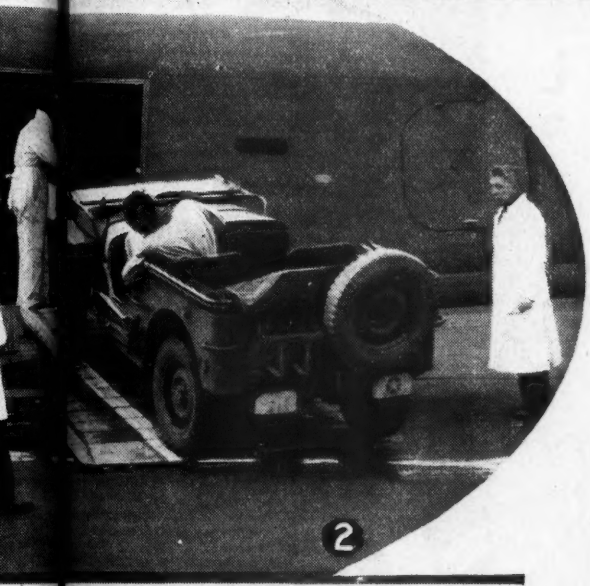
(2) Jeeps being manoeuvred up a ramp into a York. The right-angle turn inside calls for some shunting to stow in position.

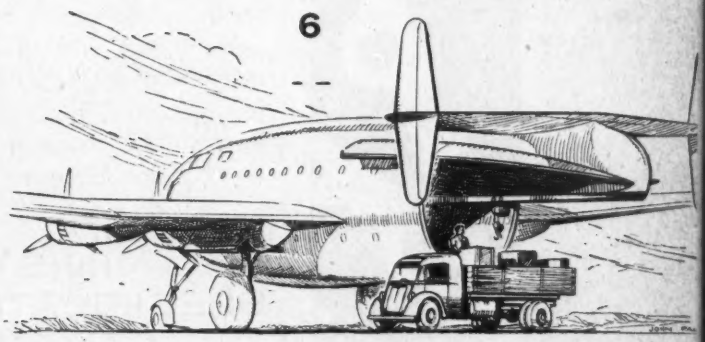
(3) A smaller type of elevator truck "offering up" a pre-loaded trolley into a Dakota.

(4) A normal lorry can back right up to the wide-open nose of the Bristol Freighter whose floor is at convenient height for direct handling.

(5) A converted bomber like the Lancastrian is not ideal for quick loading. The high nose compartment for small freight involves multiple handling.

(6) The new French freighter, the Breguet 761, has obviously been designed for quick and easy handling of the bulkiest cargo.



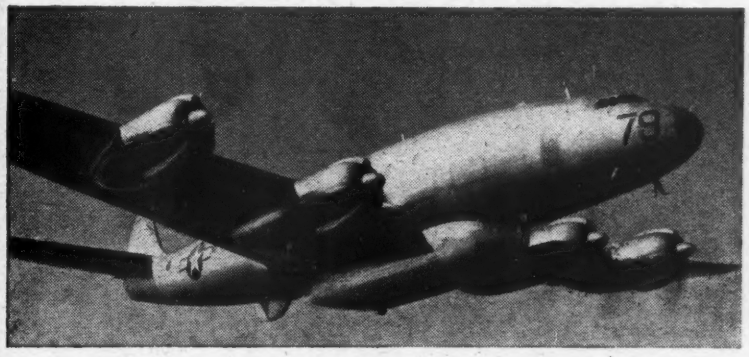


PETROL
OR OIL?
Langite jointing will make a perfect seal without heavy mechanical pressure between joint faces.
Resists Oil, Aviation Fuel, Benzol, etc.
TO
AIR MINISTRY
SPECIFICATION
No. DTD 219A
Langite inspection and testing facilities have received Air Ministry Approval
CORK MANUFACTURING CO. LTD.
SOUTH CHINGFORD, LONDON, E.4
Telephone: Silverthorn 2666 (7 lines)
(Associated with Flexo Plywood Industries Ltd.)
LANGITE
JOINTING MATERIAL
RESISTS OILS, SPIRITS · PETROL · BENZOL

HANDLING AIR CARGOES

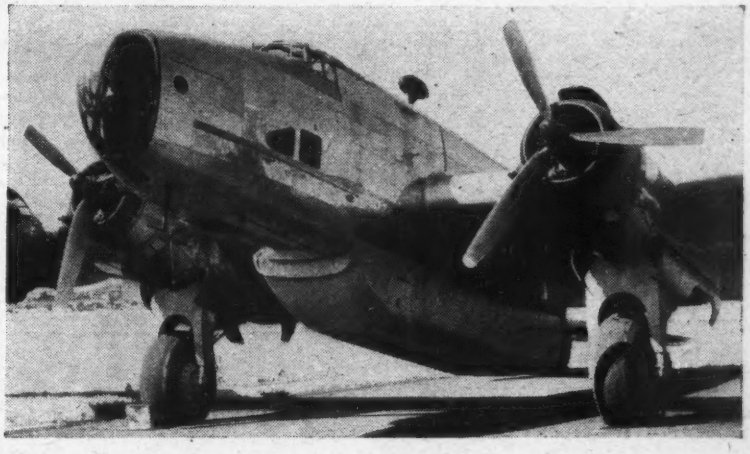
lowered to form an easy slope between the floor of the aircraft and the ground. Nothing could be more simple, and the largest items of freight can be on- or off-loaded in little more time than it takes a V.I.P. to climb the steps into a Skymaster.

It is, in fact, the low-wing aircraft with its necessarily high loading level that calls for special equipment in handling freight with minimum delay. This is true whether it be fitted with a tricycle undercarriage or not, though a horizontal floor certainly facilitates disposing of the cargo inside the aircraft unless it can be loaded through a door at the front of the compartment and unloaded from one at the rear, in which case the sloping floor may be made to function as a chute and thus assist in the process. In such an event, too, both processes could go on simultaneously, whereas when only a rear door is available, the unloading must be completed before the reloading can begin.



(Above) The Constellation's "Speedpak" carries 4 tons but only costs 10 m.p.h. in top speed.

(Right) The cargo pannier of the Halifax VIII transport fits snugly into the original bomb bay.



The front loading door of the DC-3 is 9ft 10in from the ground, and the rear door 4ft. To cope with these quite typical conditions, such pieces of ground equipment as the fork-lift truck and the belt-loader have been developed. The former is a particularly useful vehicle, since it can be loaded in the hangar in readiness for the aircraft's arrival, and can then carry the freight out and offer it up to the loading door at any height up to about 14ft. Alternatively, it can tow a pre-loaded baggage trolley to the aircraft and lift it bodily to the loading platform. The belt-loader (according to Mr. Crawford) has some serious shortcomings in its present form, but an improved type—a combination truck and belt-loader—is being developed which is expected to be a great improvement, especially in the matter of mobility.

For unloading from such types as the DC-3, a simple chute is now generally regarded as the most practical method. Admittedly it has the disadvantage that, if straight, heavy items come down too fast for the comfort of the man at the bottom, and light—or low density—packages tend to stick halfway. The straight chute is also a somewhat unwieldy affair and gets in the way, and it has therefore been suggested that both these snags might be mitigated by a circular chute of stainless steel which would slow down the heavier packages and would unload under the aircraft clear of embarking passengers and freight.

When we come to the larger types of aircraft, such as the C-74 and C-97, both of which have tricycle undercarriages and thus stand with a level floor, the engineers have gone a long way to expedite cargo handling by installing electric hoists and mono-rail systems as part of the aircraft to handle cargo inside the main cabin and out into the ground carriers. In the case of the C-74 (Globemaster) the freight elevator is a section of the cabin floor that can be lowered to the ground and raised by travelling crane equipment which also distributes the cargo via overhead rails attached to the cabin roof. The C-97 makes use of pallet pre-loading with very similar equipment.

By contrast, the DC-6 (civil version of the C-54 Skymaster) and the Constellation present cargo-handling problems which are "prize headaches" even for types primarily concerned with the transport of passengers. In these two airliners, the cargo holds are the spaces left under the flooring of the passenger cabins, and as the headroom in these "belly pits" is only about 36in, the unfortunate loaders presumably have to claw the baggage into position on their hands and knees. However, the problem was recently tackled by the airline operators themselves in the case of the DC-6, and the final solution took the form of special containers designed entirely to fill the available space in the pits (four containers to each of the two pits); these containers are pushed in on mono-rails and then locked in position. In order to avoid "stacking" at various airports, the DC-6 always carries a full complement of cargo containers; in order to put in a loaded container, an empty one, or one destined for that airport, must first be taken out.

In the case of the Constellation, however, the problem was tackled in quite another way by designing a streamlined container, known as the "Speedpak," to fit snugly against the underside of the fuselage and capable of being attached and detached very quickly. A built-in electric hoist raises and lowers it, and Lockheed's claim that it can be attached and locked in position (or the reverse process performed) in exactly two minutes. This Speedpak makes a sizeable addition to the aircraft's payload; it is 33ft long, 7ft wide and 3ft deep and carries no less than 4 tons of freight (one ton more than a Dakota's full load!) on flights up to 1,500 miles at a cost of only 10 m.p.h. in maximum speed. Flight characteristics are reported to be unaffected. With the Speedpak in use, passenger baggage and mail or other freight can still be carried in the normal holds beneath the floor of the cabin, though one imagines that most operators would reserve these "belly pits" very definitely for

HANDLING AIR CARGOES

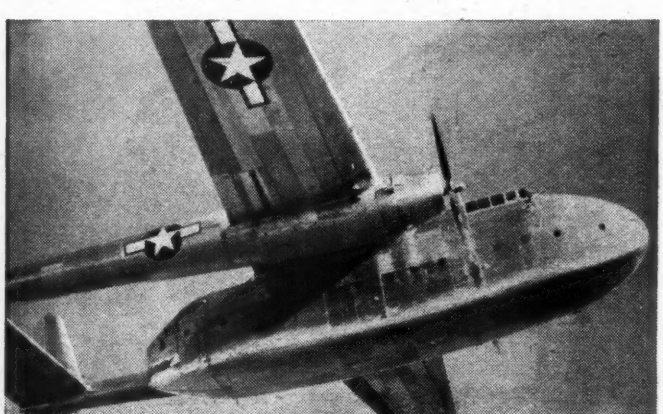
goods marked "not wanted on voyage."

A contemporary development of much the same kind has been evolved by Handley Page on the Halifax VIII transport, an interim civil type pending the arrival of the Hermes in regular service. In converting the bomber into this civil transport version, advantage has been taken of the generous dimensions of the original bomb bay into which is fitted a special streamlined pannier, raised and lowered by winches in much the same way as the Constellation's Speedpak. The pannier carries 8,000 lb and has loading hatches fore and aft, but it can be pre-loaded at an airport, thus facilitating a rapid "turn round" and minimum loss of time on the ground. Such cargo "blisters" are, of course, chiefly for use on short-range operations where the time-on-the-ground factor assumes greatest importance. In fact, in the case of the Constellation, the Speedpak is advocated as virtually converting the aircraft from a high-speed long-range passenger type into a short-range weight-lifter.

MAXIMA: A small saloon car represents both maximum weight and maximum capacity of the Aerovan's load and also demonstrates maximum ease of cargo handling.

When considering aircraft designed primarily as freighters, the three current designs already mentioned, the Bristol Freighter, the Miles Aerovan and the Fairchild Packet (C-82 in the U.S.A.A.F.) call for none of the special ground equipment such as fork-lifts, chutes and so on. Their low and level (or nearly level in the case of the Freighter) floors, square-sectioned fuselages, and large entrances make them as easy to load and unload as the lorries that bring the freight to the airport; in fact, in the case of the Aerovan and the Packet a motor vehicle can drive straight in if necessary.

The Aerovan is designed for a maximum load of one ton and has a cargo capacity of 530 cu ft. The fuselage tail fairing is hinged and swings open to provide an entrance of practically the full area of the fuselage rear cross-section, approximately 5ft square. Headroom inside increases from a minimum of 5ft 3in to 6ft 8in, there is a ground clearance under the single tail boom of 8ft 4in and the level floor of the fuselage is only 2ft from the ground. This means that a small motor lorry or light van can be backed right up to the loading platform and mail or other items of freight directly transferred. A 10 h.p. saloon car of popular make (weighing less than 20 cwt) can be driven straight inside by using a short ramp. The pilot's cabin has a door on the starboard side and another leading back into the hold.



CARGO IN BULK: The Fairchild Packet, with its 9 tons of cargo in a rectangular "hold," has aptly been named the Flying Boxcar.

The Bristol Freighter's cargo-hold has a capacity of 2,020 cu ft, and access to it is gained by hydraulically operated doors that split the nose of the fuselage wide open to its full width. This has been made possible by arranging the pilots' cabin as a separate shallow "flight deck" above the fuselage proper, and though this is normally reached by a permanent ladder (which folds flat against the wall of the fuselage when not in use) just inside the nose there is also a door on the starboard side giving direct access to the cabin This can be a very important point where saving time on the ground is concerned. In certain types, not primarily designed as freighters, it is necessary for the crew, or ground staff checking and running-up engines, to use the entrance through which the cargo is passed. They have to squeeze past freight being manœuvred in or out and inevitably get in the way of those handling it with resultant all-round inconvenience and waste of time. A separate cabin entrance avoids this.

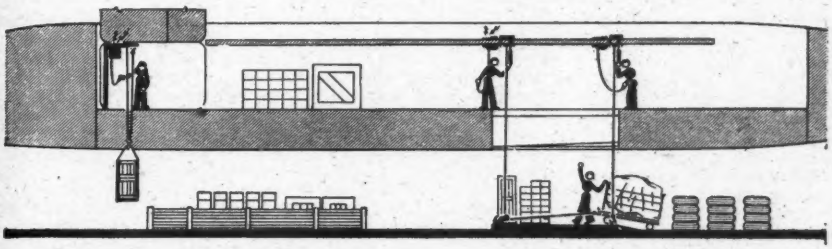
Standard Containers

Further to facilitate the handling and stowing of freight, the Bristol concern has designed five standard types of container for use with the Freighter, the base of each one being related to a series of standard sizes to simplify the allocation of the floor area. These five types of container (two of which can be collapsed when empty) cater for almost every kind of cargo from fruit to furniture. Ground handling is expedited by carrying each container on a separate truck from which it can be lifted to the 4ft 6in floor level of the aircraft by a hoist in the nose; alternatively it can be loaded direct from a ground vehicle. Rollers, fitted in the floor, facilitate sliding the containers into position, and the necessary sorting according to weight and destination is simplified by a system of colour marking, loading being carried out with the slide-rule type of calculator used by Transport Command but suitably modified.

Both the Aerovan and the Freighter are intended to give the maximum operating economy on short-distance work, and since the last ounce of air speed is not vitally important, both have fixed undercarriages which are lighter and less costly than the retractable kind. The

Fairchild Packet, however, was intended to transport military loads at higher speed over much greater distances and its tricycle undercarriage is retractable. Its 48ft long, square-sectioned fuselage which can carry a 9-ton payload has earned it the nick-name of the "flying boxcar" and it has a top speed with full load of 200 m.p.h. The tail surfaces are carried on tubular booms which are extensions of the engine nacelles, and access to the capacious hold is gained at the rear where the tapered tail of the fuselage hinges open on each side to give full-width entry. Thus cars or lorries can be driven straight inside up a built-in ramp which is lowered to the ground from the low loading platform. Here again, no special ground equipment is required (a vital point when supplying fighting units at forward airstrips) and the Packet is believed to have an assured future in the purely commercial peacetime fields.

German developments in the carrying of air cargoes, mainly directed towards military uses, produced some unconventional designs during the war years, though the pre-war Ju 52 and its sub-types remained the most widely-used and was roughly their transport equivalent of the Allies' DC-3. The famous three-engined Junkers was primarily intended as a passenger machine (with a typically Nazi eye on its bomber potentialities) and as a freighter it suffered most of the usual limitations common to low-wing aircraft with conventional undercarriage. It had, however, the advantage of a roomy, slab-sided fuselage and it was, with its flapped and slotted wings, a redoubtable



A section of the Globemaster's cabin floor can be lowered, as shown in this diagram, to facilitate cargo handling ; a monorail ensures quick and easy stowage within the fuselage.

weight-lifter which could operate in and out of comparatively restricted airfields.

The four-engined Ju 290, first test-flown in 1941, was, however, designed as a transport and its square-sectioned fuselage had a loading ramp built into the bottom. This was hinged at its forward end and was operated by a mechanical jacking device which also raised the tail of the aircraft from the ground to give loading clearance. Later a much larger version of this type, designated the Ju 390, was introduced, but even this was of limited usefulness, and two far less conventional transport types appeared. They were the Me 323 and the Ar 232, both high-wing aircraft providing low-loading facilities.

The Me 323 was developed from the Me 321 transport glider, and basically it was the same design plus engines. The large square-sectioned fuselage was completely devoted to freight stowage, the crew being accommodated in a "flight-deck" above the fuselage proper as in the case of the Bristol Freighter. Access to the hold was, also like the Freighter, through a split nose which opened the full width of the fuselage. The undercarriage was a fixed multi-wheeled affair. The aircraft carried its own ramp which was adjustable for the varying wheeltracks of vehicles to be run in and out, and in the hold were locking points to secure the cargo firmly.

The Ar 232 tackled the low-loading problem in an even more ingenious way. Its normal undercarriage was a retractable tricycle, but under the fuselage was an array of 11 pairs of small wheels. The oleos of the main undercarriage had knee-action joints, and for loading and unloading these were operated to lower the aircraft on to the "belly wheels." Access to the cargo hold was by a ramp which was formed by lowering part of the rear wall, aft of which the fuselage section diminished to a mere boom level with the fuselage top.

Two more German designs merit brief mention though they never got any further than the drawing board. It was intended to build them in French factories, but D-Day put a stop to that. These were the Fi 333 and the ZSO 525. The former was a development of the multi-purpose Fieseler design of 1942, and it is interesting in that it used an idea now seen even more effectively adapted in the Constellation's Speedpak and the streamlined pannier of the Halifax transport. A detachable cargo compartment measuring 24½ft × 7ft × 6½ft was fitted beneath the forward part of the specially designed slender fuselage; without its container, the aircraft could be used for salvaging and transporting whole wings and fuselages, complete fighters, lifeboats and so on.

Continental Giants

The ZSO 525 was really a scaled-up version of the Me 323 and had a cargo capacity of some 8,000 cu. ft. The same split nose entrance was retained, but there was an additional ramp at the rear which meant that loading and unloading could go on simultaneously, and thus almost halve the time spent over these two operations.

Finally, an interesting new French design was recently illustrated in *La Vie des Transport*. This is the Breguet 761, a very large mid-wing type with four engines, a fat oval-sectioned fuselage, and retractable tricycle undercarriage. Entry to the hold is provided by a pair of "bomb doors" which virtually split the lower part of the tail wide open in a manner best appreciated by reference to the sketch on page *b*. The loading level is about that of the average motor lorry, but a small hoist appears to be fitted to a rail beneath the fixed upper segment of the tail, by which packages can be transferred between aircraft and ground or motor vehicle with minimum effort.

Since few things are more dangerous than the accidental shifting of cargo during flight, many complete cargo tie-down schemes have been devised and operated both for military and commercial loads. These range from simple tie-down ropes and nets attached to rings in the floor and sides of the hold, to complicated bars and beams with jacks to take up the slack and hold everything firmly in place.

One important point in the saving of time on the ground has still to be mentioned; the arranging of cargo in the aircraft so that items to be unloaded at intermediate stops on the route can be put off without having to shift too many other packages. This may sound a very simple matter—just a case of placing the packages in the correct rotation in relation to the door—but in practice it does not work out quite so easily.

Besides the weight distribution factor, where freight is stowed in a series of cargo pits it has been found almost impossible (by some of the best-known operators) to stick to a pre-arranged system. To quote Mr. Crawford again, "The trip may start out in order, but before it has made three stops you are apt to find cargo for any stop in any pit. The result is a mad search at every station and the on-cargo is put in any pit it will fit in order to keep from delaying the trip."

This particular problem was seen at its worst with the "belly pits" until the container and Speedpak systems already described mitigated the trouble.

CIVIL AVIATION NEWS

B.O.A.C.'s Terminal : A Charter Association : Another Civil Aviation Debate : G.A.P.A.N. Ceremony

NEXT STOP CAIRO: Coffee and rolls in a Short Hythe over the Mediterranean.

THE BILL

THE Civil Aviation Bill completed its Committee stage on June 27th. The Report stage of the Bill was due to be taken in the House of Commons last Monday, and continued to-day, when the Bill will also receive its Third Reading.

DOVE EXPORT

THE first De Havilland Dove to leave the production line at Hatfield has now been shipped to Canada, where it will be used as a demonstrator in the North American continent by the Canadian D.H. company. The second production Dove will, very shortly, be taken to Australia for similar duties, and, thereafter, "straight" deliveries will be started.

FOR THE TASMAN SERVICE

THE first of three Short Sandringham boats which are intended for the Tasman Empire Airways Service between Sydney and Auckland was launched last week at Short and Harlands, Belfast. This Sandringham was named *Tasman*, while the other two boats will be, appropriately enough, called *New Zealand* and *Australia*. They are being arranged with luxurious accommodation for thirty passengers, and, when in service, the schedule will be increased to seven a week.

The launching ceremony was attended by, amongst others, Mr. Arthur Woodburn, the Parliamentary Secretary to the Ministry of Supply, and Mr. Ivor Thomas, Parliamentary Secretary to the Ministry of Civil Aviation. At the lunch which followed, the various points concerning the decision to transfer Short Brothers' activity to Belfast were explained.

SOUTH AMERICAN CO-OPERATION

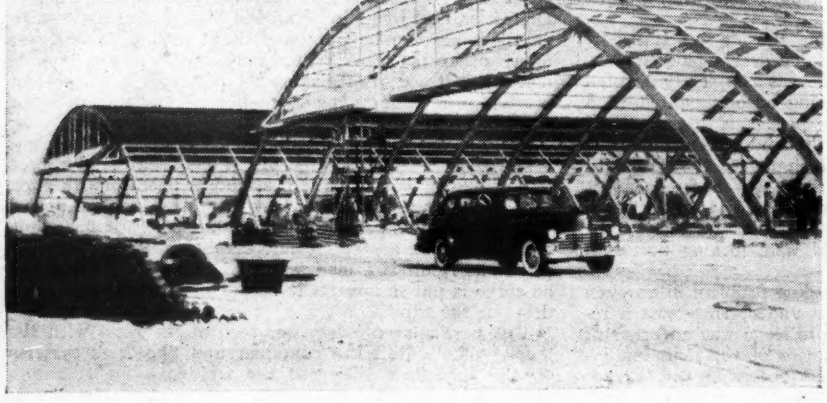
DURING a recent visit to this country, members of the Argentine Department of Civil Aviation, and the director-general of the National Air Company, Flota Aerea Mercante Argentina, have revealed their plans for their services to Europe. The intention is to operate three times weekly, in "collusion" with B.S.A.A. under the Anglo-Argentine Agreement, using Sandringhams for one service and the recently purchased Yorks and Tudors for the others. Two Yorks are due for delivery in July and one in August.

The boat operations are being performed under contract by Compagnia Argentina de Aero Navegacion Dodero, S.A., the original purchasers of the Sandringhams. British Aviation Services are agents for both Fama and the Dodero in Europe and Africa, and this function will shortly be discharged through a new company now in process of formation and to be known as Argentine Aviation Services with offices in Brook Street.

B.O.A.C.'s NEW YORK TERMINAL

IN connection with the B.O.A.C. London-New York service, which started on July 1st, a great deal has been said about traffic densities at La Guardia airport and the long delays frequently experienced both in the air and on the ground. For the time being B.O.A.C. Constellations will use La Guardia and the Marine terminal buildings with other transatlantic operators, and so far at least, thanks to the weather, there has been little delay on landing and take-off for proving flights and initial services. However, with the density of traffic approaching its "good weather limit," and already well over bad weather potential, alternative airports are being sought.

"*Flight*" *photograph*



The ex-military MacArthur field (Islip) situated some 50 miles north of New York on Long Island is favoured at present. There seem to be no insurmountable obstacles to prevent its use by B.O.A.C. or other companies and there

HEATHROW COUNTERPART: Idlewild, some 12 miles from New York, at present appears as a flat, sandy waste on the Jamaica Bay shore. There are three runways, some contractors' huts in the position of the airport buildings and the two skeleton hangars illustrated.

CIVIL AVIATION NEWS

are three good runways, hangars and, it is understood, suitable buildings. Negotiations are at present taking place but agreements have yet to be signed. Customs and passport facilities, without which the airport would be of no value to B.O.A.C., have still to be organized. In addition poor weather approach equipment and other airfield installations must be provided.

The new airport under consideration at Idlewild—"the Sahara of Jamaica Bay" as it is nicknamed—is far from finished although it, too, has three runways. In order not to delay completion in any way, this airport will not be opened at least until initial constructional work is finished. So far there are no completed hangars or buildings, no light, power or telephones, and political and trade union issues seem likely to hamper the work of completion and postpone the opening for many months to come. Elsewhere in this issue of *Flight* is a description by the Assistant Editor of his journey to and from New York on a B.O.A.C. Constellation. While there he made a brief study at first hand of the airport situation and the present facilities. It is intended to give a fuller story of the position in a coming issue.

AIRWORTHINESS ANACHRONISM

WITH the best intentions in the world, it is always dangerous to claim historical priority for any event. In the issue of June 27th we claimed on the best authority that the Bristol 170 was the first British civil aircraft to obtain an unrestricted C. of A. The statement was misleading rather than incorrect, since the words "civil aircraft" were intended to cover only full-size transports. In fact, unrestricted C. of A.s had previously been issued, we are told by the firm, to four Miles types, including the Aerovan, which received its C. of A. on October 5th, 1945.

AER LINGUS TAKES OVER

RESPONSIBILITY for the operation of all air services between Britain and Eire was taken over, under the new Anglo-Irish agreement, by Aer Lingus on Monday, July 1st. Previously the services were operated by Aer Lingus in conjunction with West Coast Air Services. Four services a day are being provided in each direction on the London-Dublin route which is being operated with D.C.-3s, bringing the total daily carrying capacity in each direction up to 84, compared with the previous maximum of 54.

The frequency on the Liverpool-Dublin route is being stepped up to five services in each direction daily, D.C.-3s being used on three services and D.H.-86s on the other two. The D.H.-86s will probably be replaced by additional D.C.-3s within the next few weeks.

G.A.P.A.N. CEREMONIAL

DURING a short but impressive ceremony at the Royal Aeronautical Society last week, the Master, Deputy Master, Wardens and Court of the Guild of Air Pilots were duly "installed" for the year. The Marquess of Londonderry, P.C., K.G., M.V.O., has been re-elected as Master, while the Deputy Master is now Wing Cdr. N. H. Woodhead. The Wardens are Air Vice-Marshal D. C. T. Bennett, Grp. Capt. P. W. S. Bulman, Capt. A. G. Lamplugh and Mr. J. Lankester Parker. The Members of the Court for this year are Mr. F. C. Chichester, Grp. Capt. W. N. Cumming, Capt. H. D. Davis, Air Cdre. A. V. Harvey, Wing Cdr. H. F. Jenkins, Wing Cdr. G. E. Lowdell, Wing Cdr. R. J. B. Pearse, Wing Cdr. C. A. Pike, Mr. J. K. Quill, Capt. J. E. D. Scott, and Mr. G. A. V. Tyson.

After the ceremony, which lasted for only a quarter of an hour, a reception was held. This was attended by, amongst others, the Minister of Civil Aviation, Lord Winster, and his Parliamentary Secretary, Mr. Ivor Thomas. Such receptions provide an admirable opportunity for view-exchanging amongst aircrew and others, and it is a pity that, in these days, they cannot more often be arranged.

Incidentally, the Guild has recently organized its Employment Advice Bureau under a special committee, and personal contacts are being arranged with all prospective employers. In future, candidates will be interviewed by members of this Guild committee, their qualifications assessed, and their names suitably tabulated. Applications for all classes of aviation employment will be handled.

CHARTER ASSOCIATION

IT was inevitable that, sooner or later, an association of charter companies would be formed, but the fact that it has appeared so comparatively soon is a sign of its necessity. Not that it is yet—at least, at the time of writing—quite in official being, but the first meeting, which was attended by all but one operator, was held towards the end of last month. This was organized largely by Mr. D. L. Eskell, the general manager of Morton Air Services, Croydon, which was one of the first charter companies to start operations.

At this meeting, one hears, the points discussed were of an immediately practical nature, and the various political aspects of charter operation, with the question of what they may or may not do, were left severely alone. Immediate decisions were reached on the question of flying rates for different aircraft types, at least as far as Western Europe is concerned, and the problem of the costs of demurrage—to use a shipping term which covers the rates of hire to be charged when an aircraft is grounded, at the discretion of the passenger, during a tour—was, for instance, discussed. Altogether, the new association shows signs of a very useful life, and it will certainly be of immense value when there is any need for legal assistance.

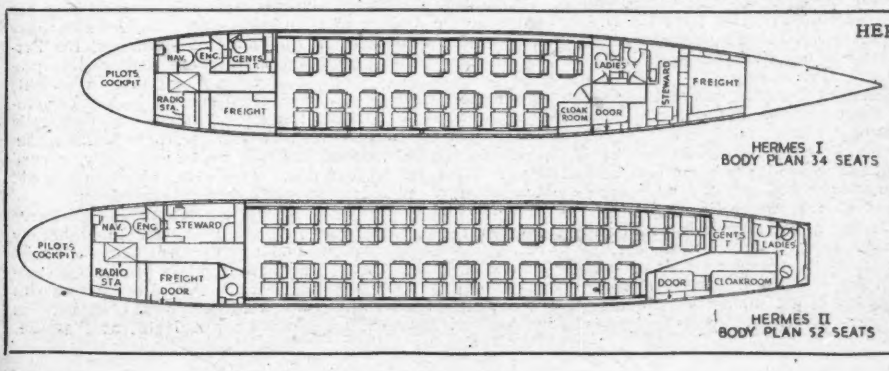
SWINGS AND ROUNDABOUTS

AS we pointed out in leaders both last week and previously, any attempt to analyse accurately the position of charter operators under the Civil Aviation Bill is extremely difficult.

It would appear that the Government's view is that, under the Bill, an air service which is not available to members of the public is not a scheduled journey and, therefore, can be run by a charter operator, who acts rather like a taxicab driver and just waits for a "fare," and then takes him whithersoever he wishes. In fact, this air taxi could make three journeys or even more to the same destination, provided that the operator had no knowledge beforehand that he was going to be called upon to make these similar journeys. On the other hand, it is equally legitimate for a person to charter an aircraft for his own private purposes for a regular journey—daily if necessary—between two points, always provided that he does not offer any spare seat to a member of the public for reward.

There is to be no sliding round the regulations by means of the employment of a tourist agency, because the latter must not do anything which the charter operator cannot do. It must not, for example, arrange in advance for an aircraft to fly between two points and then ask the public to take seats in that service, but if, on the other hand, the public asks an operator to fly it between the two self-same points and takes the whole space in the aircraft, that is permissible.

As it is abundantly clear that the combination of a charter operator and a travel agency cannot run regular tours—because such tours inevitably amount to a systematic service—a good many questions have been asked, and explanations required, at various times during the Committee stage of the Civil Aviation Bill as to the activities of Skyways. Mr. Ivor Thomas agreed



HERMES DEVELOPMENT—The two arrangement plans on the left show the major differences between the Handley Page Hermes I and II. The latter will have its fuselage length increased by more than 13 ft., to give a total length of 95 ft. 6 in. Shown here in 52-seater form, it can be arranged to carry 64 passengers. The Mark III version will be powered by Bristol Theseus airscrew turbine units.

CIVIL AVIATION NEWS

that the position of Skyways appeared somewhat complicated, but he maintained that they were running luxury tours to Switzerland at the moment because B.O.A.C. is not itself yet ready to run such tours. In any case, in regard to those particular flights, Mr. Thomas asserted that while they were perfectly legitimate under present law, they might well be in an entirely different position if the new Civil Aviation Bill receives the Royal Assent!

The suggestion that, although it might not be worth the Government Corporation's while to start a scheduled service to some remote place which, nevertheless, a number of people wanted to visit, it would still not be legal, instead, for an enterprising charter company to undertake such a service, was pooh-poohed by Mr. Thomas. He declared that what was worth while for a private operator was worth while for the Corporations. As it was clear from this reply that a scheduled service even of this kind would be the perquisite of the Corporations, the question was quite rightly raised as to what happened if the Corporations refused to undertake the work—to which the answer is that, if the Corporations are unable, owing to the full use of their aircraft, to undertake the job, it would be open to them to invite a charter company to do the work as an agent. Such is now being done, in fact, in the case of Skyways.

However, two clear decisions have been given by the Parliamentary Secretary which should cause the charter operator to take heart. First, it has been made clear that as soon as the Civil Aviation Bill is law, private companies will be entitled to start running regular air ambulance or air rescue services anywhere in the country, even though there may be an existing service on the same route; and, secondly, that, as the Bill is confined to the United Kingdom, British charter firms will be able to take all the business they can get in foreign countries with, it seems, a blessing from the Minister of Civil Aviation—provided that they not only comply with the municipal laws which apply in that country, but also with any agreement into which this country has entered with the other nation concerned for the regulation of charter flights.

Another Civil Aviation Debate

More About the International Agreements : The Anglo-Eire Situation

APART from the points which were raised concerning our production of and orders for civil transport aircraft, the outstanding questions during the debate on Civil Aviation—which took place in Committee of Supply on the Civil Estimates in the House of Commons on June 26th—concerned the terms of the various agreements made with other countries and the Dominions. As pointed out in last week's issue of *Flight*, the Parliamentary Secretary to the Ministry of Civil Aviation was at great pains to convince the Committee that there was no cause for disquiet over any of these agreements, particularly those with Italy and with Eire, about which there has been much controversy.

On the subject of agreements generally Mr. Thomas said that these might range from plans for giving managerial and technical advice on a commercial basis, to the setting up of joint companies in which one of the British Corporations had a substantial capital holding and was proportionately represented on the Board. As examples of the first arrangement he cited Iraqi Airways, and also Middle East Airlines in the Lebanon, both of which were operating with technical advice from B.O.A.C., while in the Sudan a national company had been formed, with a British firm, Airwork, Ltd., responsible for flying and technical services on a managerial basis.

When dealing with the p licy of joint companies the Parliamentary Secretary pointed out that they were oversea companies—generally foreign—in which a majority British "holding" would be rightly resented. Such companies would fail in their purpose unless they had the goodwill of the countries concerned; there would also be international complications. Mr. Thomas was satisfied that, under the Final Act of the Chicago Conference, a country might refuse rights to the air lines of another country if it were not substantially owned and effectively controlled by the latter's own nationals.

On the subject of the Anglo-Italian Agreement, Mr. Thomas's explanation of how it came about did not conform with the stories of international complication which had been indicated in all previous reports. Instead, he suggested that the Agreement had been arranged in the most prosaic manner and had arisen, in the first instance, from an invitation from the U.S. delegation at Bermuda to participate in an agreement which was already in an advanced stage of negotiation between Trans-World Air Lines and the Italian Government.

Nothing in the Agreement prevented a U.K. corporation from operating services between this country and Italy, subject to the terms of a bilateral agreement which would, in due course, be negotiated with Italy. The French Government had been kept informed of the negotiations, and provision had been left in the Agreement for French participation at a later stage.

When Mr. Thomas turned to the Anglo-Eire Agreement, he first of all explained the terms of the annexe in detail and suggested that, in the present state of aeronautical development, it was essential that trans-Atlantic aircraft *flying over Eire* should land at Shannon Airport, and it was therefore no hardship to accept the obligation of a compulsory stop there. He pointed out, however, that we were under no obligation always to fly over Eire en route to the U.S. or Canada.

Regarding the provisions of the agreement over Aer Lingus, the Parliamentary Secretary made the point that the policy that two countries, especially when they are adjacent, should pool their resources, had much to commend it on grounds of commonsense and economy. The arrangement with Eire, however, went beyond the mere integration of services. In fact, it extended the services radiating from Shannon to various European capitals, and these were services in which the U.K. or its air lines could claim no independent interest, and on which, obviously, we could claim no priority. He insisted that the Eire Government was under no obligation to accept our participation in these Continental services and *might equally well have invited a foreign operator to participate.*

Cabotage Rights

The joint company would have the monopoly of cabotage rights between Shannon and Dublin, in which the U.K. carrier by itself would have no title to cabotage rights. It was only equitable, therefore, that the U.K. should grant some such rights in return. Explaining why it was agreed that Eire should hold 60 per cent of the capital, he pointed out that the joint company was to operate services from Eire to a number of European countries, and that, under the Chicago Agreement, any of the latter would be entitled to refuse rights to this company if substantial ownership and effective control had been in other than Eire hands.

On routes between Eire and the U.K. profits and losses would be shared equally. With regard to the other routes, however, the Eire authorities had pointed out—"with justice," said Mr. Thomas—that, but for the agreement the U.K. would have no claim to be associated with operations on these routes; that we were benefiting in many ways directly and indirectly from the partnership; and that it was equitable that, in return for these benefits, we should bear 50 per cent of any losses incurred. Any profits, however, on these same Continental services, would be divided in a ratio of 60 per cent to Eire and 40 per cent to the U.K.

A number of other agreements were mentioned during the course of the Debate and, in addition to those which have already been dealt with in *Flight* at various times, the Parliamentary Secretary said that negotiations had been in progress with Uruguay, Chile and Brazil, and that agreements with those countries were now being studied by the Governments concerned. Further, other agreements had been generally settled with the Netherlands and with the three Scandinavian countries. In the case of Belgium, we had virtually reached an agreement, but we had now suggested that its terms should be modified to coincide with the Netherlands agreement.

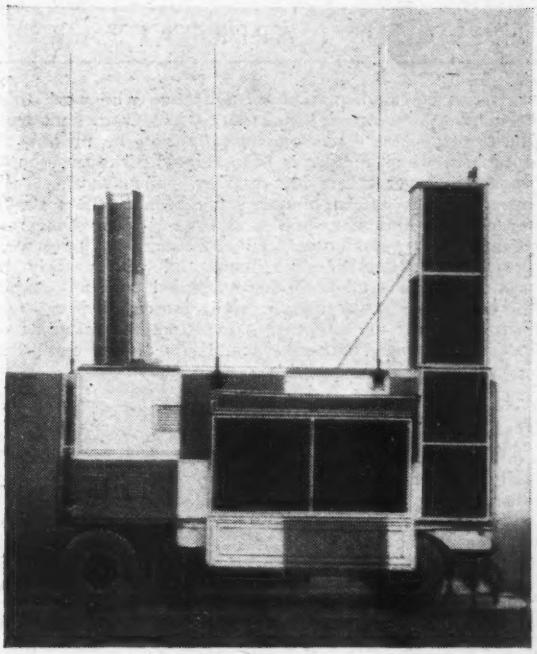
Mr. Thomas claimed that the pattern of our air agreements was thus practically complete. It could not be absolutely complete, however, until we had an agreement with the Soviet Union. He added that the Foreign Secretary himself had proposed to M. Molotov that negotiations should be opened with the Soviet Union for air services on a reciprocal basis between London and Moscow, but M. Molotov had not, at the time, "felt able to agree."

Approach by Ground Control

The G.C.A. System Described: "Search" and "Precision" Indicators: Talking the Pilot Down

THE G.C.A. (Ground-controlled Approach) system of blind approach is a radar navigational aid which was originally developed by the Massachusetts Institute of Technology early in 1940 and is in extensive use in many parts of the world. At the moment nine R.A.F. airfields are equipped with it: they include those at Prestwick, Manston, Lyneham, St. Eval and Waddington.

It differs from all other approach systems in requiring no special equipment in the aircraft (apart from normal H.F. or V.H.F. R/T), and landings have been made in conditions of zero visibility by pilots who have had no previous training and, indeed, *have never even previously heard of the system.*



The G.C.A. trailer which houses the radar gear and its operators. This trailer, with its generating plant, is placed some 375ft. from the centreline of the runway, and at an angle of 85 degrees to it.

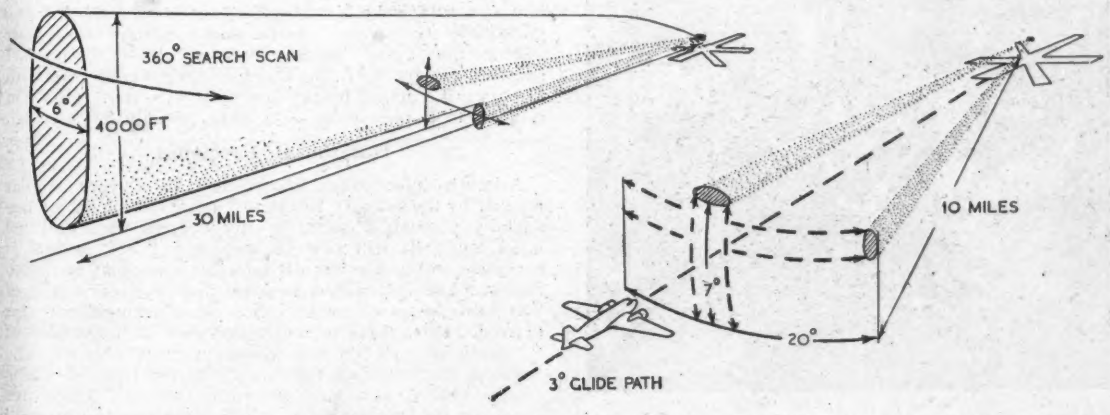
Obviously, if a Controller on the ground can be given exact and continuous information concerning an aircraft's position, he should be able to "talk the pilot down" to an airfield by giving him the correct courses and rates of descent. This is not particularly difficult once the correct technique has been worked out—a sample of the R/T "patter" is given later—and any reluctance on the part of a pilot to obey a disembodied voice is easily overcome once he has made a few practice approaches in conditions of good visibility. G.C.A. Controllers are chosen for what might be called their "bedside manner," and any pilot who has used the system operationally will testify to the beneficial effect of a calm, confident voice telling him not only where he is and what he should do next, but even reminding him of his cockpit drill at the correct moments.

The G.C.A. equipment is fully mobile and consists of a large trailer towed by a six-wheeled truck. The truck contains the generating plant and the prime-mover, while the trailer houses the radar gear and its operators. It is possible to change runways in under thirty minutes, and the equipment is normally sited about a mile from the touchdown point and three to four hundred feet to the left of the runway from the point of view of the pilot.

The Two Stages

An actual G.C.A. landing is made in two stages. Since an aircraft may arrive at an airfield from any direction, it is first necessary to put it into the correct position relative to the runway before the approach can be started. The G.C.A. equipment is therefore fitted with a "search" radar system, using two Plan Position Indicator tubes which give a 360-degree picture of everything within thirty miles of the airfield. When an aircraft has asked for assistance, its echo is identified on the Plan Position Indicator tube (by D/F or other means) and it is directed by R/T into a circuit which will bring it to the correct position for the approach. This part of the operation is not unlike wartime G.C.I., and was, indeed, evolved from it.

Two P.P.I.s are provided so that large numbers of air-



Diagrammatic representations of the sections of the radar beams used in the G.C.A. system. Above is the search "lobe," for which two plan position indicator tubes are used to give a 360 degree picture of the area within thirty miles of the airfield. On the right is a detail diagram of the "precision" part of the system, which is used to bring the aircraft in on to the runway.

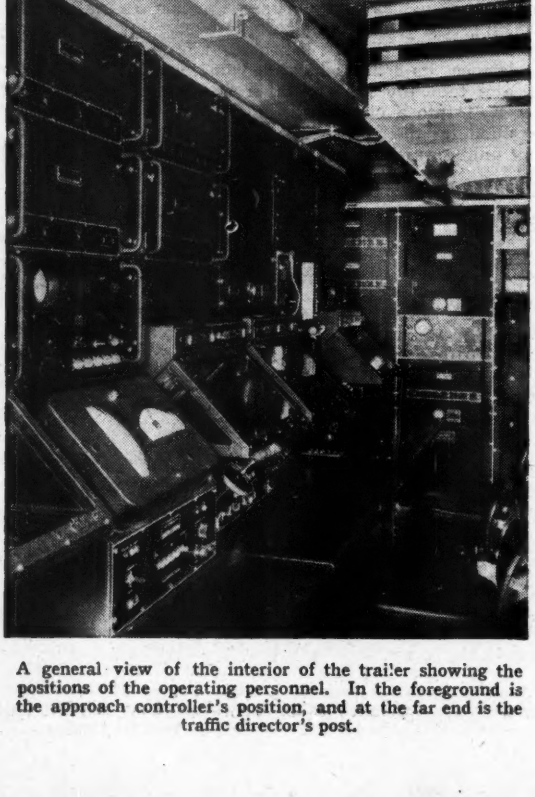
APPROACH BY GROUND CONTROL

craft can be handled, and the Directors who work from them use their own R/T channel which is distinct from the Controller's. Thus one aircraft may be making an approach, while another is being brought into position to do so, and yet others are orbiting while awaiting their turns. Up to fifteen aircraft have been handled simultaneously in this way, and have been landed at the rate of one every 3-4 minutes. These eleborate facilities were provided for bomber operations, and will scarcely be needed on the same scale for scheduled civil flying, but the continuous control of aircraft in the circuit is a safety factor of great importance. Apart from the actual landing system, the P.P.I. is invaluable for airfield control in conditions of poor visibility.

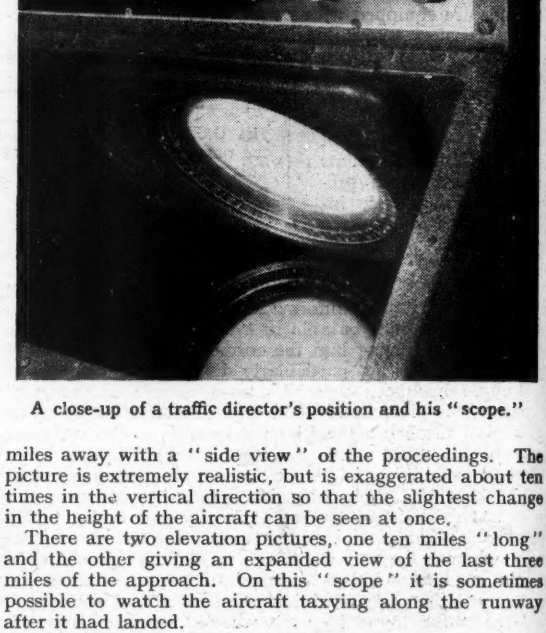
Final Approach

The P.P.I. Director has finished his job when the aircraft is about seven miles down-wind from the airfield, within two thousand feet of the approach track and heading towards the runway at the correct height (usually 1,500 feet). At this stage the aircraft becomes visible on the radar screens of the approach or "precision" system, and, as these displays are of a novel type, they will be considered in some detail.

In addition to the P.P.I. aerial, which scans continuously through 360 degrees, the G.C.A. has two other radar aerials which produce extremely tight beams—as narrow, in fact, as those of an ordinary searchlight. One of these scans rapidly in the vertical plane through an angle of 7 degrees exploring, as it does so, a narrow triangle of space ten miles long and 7 degrees high. Any echoes picked up are displayed on a pair of "Elevation 'scopes" on which the ground is shown as a horizontal line and aircraft can be watched flying above it just as if one were standing several miles away with a "side view" of the proceedings. The picture is extremely realistic, but is exaggerated about ten times in the vertical direction so that the slightest change in the height of the aircraft can be seen at once.



A general view of the interior of the trailer showing the positions of the operating personnel. In the foreground is the approach controller's position, and at the far end is the traffic director's post.



A close-up of a traffic director's position and his "scope."

There are two elevation pictures, one ten miles "long" and the other giving an expanded view of the last three miles of the approach. On this "scope" it is sometimes possible to watch the aircraft taxying along the runway after it had landed.

An operator, known as the "Elevation Tracker," sits in front of these two screens and, by means of a hand-wheel, keeps an illuminated cursor centred on the aircraft echo. By so doing he feeds elevation information continuously to the Controller, who has a large meter showing him at a glance the aircraft's distance above or below the glide-path. This meter can be read to within twenty feet —hence the phrase "precision system." Save for the last stages of the approach, the Controller is not concerned with the aircraft's actual height, but only with its "error" in relation to a preselected glide-path (usually 3½ degrees).

Horizontal Precision

Azimuth information is obtained in a very similar manner by the second "precision" beam, which scans horizontally through a sector twenty degrees wide and ten miles long. It will now be seen why P.P.I. control is necessary to put the aircraft into this somewhat restricted region. The resultant echoes are displayed on a pair of "azimuth scopes" which show this triangular sector expanded three times in width, and give the impression of "looking down" on the approach from above. The slightest movement of the aircraft to the right or left is clearly visible, and an "Azimuth Tracker" keeps his cursor on the moving echo as it flies towards the runway. Thus he, too, feeds information to the Controller, whose azimuth meter shows the deviation of the aircraft from the required track. This meter can be read to within an

APPROACH BY GROUND CONTROL

accuracy of fifty feet—which is less than half the width of a standard runway.

The Controller's two meters give him a continuous record of the aircraft's position and, equally important, of its movements. Once the two Trackers have the aircraft on their screens, the approach begins and the pilot switches his radio to "receive" while the Controller "talks him down" until he breaks cloud. Although the operating limits with this equipment are, at the moment, laid down as cloud-base 200 feet, and horizontal visibility 880 yards, aircraft in distress have frequently been landed completely "blind."

It might be thought that a mobile radar set containing the best part of five hundred valves could not give sufficient serviceability to be relied upon as a landing aid, but in practice very little trouble has been experienced. This is partly due to the fact that all essential equipment has been duplicated, and a stand-by channel can be brought into operation merely by throwing a switch.

In the past two years many thousands of approaches have been made with every conceivable type of aircraft, and it is satisfying to record that Sir Robert Watson-Watt himself was recently brought into Prestwick through 8,000 feet of solid cloud, with a base at only 100 feet. Perhaps the best comment on G.C.A. is the fact that almost all pilots who have used this system take a very poor view of any other.

Typical Patter

To conclude, an example of a typical G.C.A. approach is given. The "patter" has been evolved as a result of much experience and, as it makes use of normal flying phraseology, it is easily understood. The Controller does not speak continuously, but, as far as possible, at equally spaced intervals, so that there are no long gaps during which the pilot can get the impression that he has been forgotten. The whole approach takes three to four minutes, according to the type of aircraft being brought in.

This is roughly how it might go:

"Hallo Demi 20, this is Stratford Talk Down—turn left left ten degrees steer 260°—I say again—steer 260°—fly at 1,500 feet—how do you hear me? Over."

(Pilot confirms the reception, after which the Controller remains on the transmitter for the rest of the run. This minimises the risk that (a) the pilot might accidentally remain on "transmit" and (b) of any distraction from the job in hand—i.e., of accurate instrument flying. The only variation in this procedure occurs when there is need for emergency instructions.)

"Roger Demi 20—do not acknowledge further instructions."

"You are six and a half miles from the runway."

"Your present course of 260° is O.K."

"You are six miles from the runway—coming along very nicely."

"Check your landing gear down and locked."

"You are clear to land from this approach."

"You are five miles from the runway."

"Lose altitude at the rate of five hundred feet per minute."

"Your present course is still O.K."

"You are four miles from the runway—on the glide path."

"Turn right five degrees, steer 265—I say again steer 265."

"You are three and a half miles from the runway."

"You are above the glide path, increase your rate of descent."

"Three miles from the runway—your course is O.K."

"Coming on to the glide path now, resume normal rate of descent."

"Turn right five degrees, steer 270—I say again, steer 270."

"On the glide path—two and a half miles from the runway."

"Check undercarriage and flaps."

"Track good—two miles from the runway."

"You are fifty feet too low—reduce your rate of descent a little."

"On the glide path now, resume normal rate of descent."

"One and a quarter miles to go—on the glide path."

"Turn right three degrees, I say again turn right three degrees."

"One mile to go—on the glide path."

"Three quarters of a mile—track good."

"Half a mile from the runway—track good—on the glide path."

"Quarter of a mile to go—look ahead for the runway and land when in visual contact."

FROM THE FLYING CLUBS

DURING its first six months of operation, Marshall's Flying School has flown a total of 1,523 instructional hours, and has trained 27 pilots to various licence standards. During the same period, more than 700 hours have been flown on charter work in Europe, and as far afield as South Africa. Remembering the almost entire lack of interest which has been shown by the powers-that-be, this performance at least indicates the amount of public interest and support both for flying training and air travel generally. Marshalls' now have five Tiger Moths in service, as well as two Proctors, an Auster and a Rapide. Delivery of a Miles Messenger is expected within the coming two months.

* * *

To-morrow, July 12th, the Cinque Ports Flying Club is due to be reopened at Lympne. Arrangements with the Ministry of Civil Aviation have now been completed, and the aircraft—two Tiger Moths and an Auster—have been duly overhauled. The flying rates will be £3 10s an hour for dual and solo on Tiger Moths, and £3 on Austers on week-days, with an increase of 10s an hour for each type during the week-end. The club-house, including restaurant facilities, which was actually used by the club before the war, will be reopened. The address of the club is Lympne Airport, Kent, and the telephone number is Hythe 6617.

* * *

As recorded in last week's issue, the South Coast Flying Club was restarted on June 29th at Shoreham Airfield. The simple "opening" ceremony was performed by Alderman Annis, chairman of the Brighton, Hove and Worthing Airport Committee. Afterwards the R.A.F. put on a show with three Vampires from No. 247 Squadron and three Meteors from 234 Squadron, for the entertainment of the members and guests. As the last Meteor departed, its pilot offered the club his good wishes by radio through the loudspeakers. During the afternoon flights were given in the Miles Gemini and Messenger.

At present, only temporary club accommodation has been provided by the Ministry of Civil Aviation, but it is hoped that the terminal building will be ready for occupation in about six months. The pre-war chief instructor, Mr. Cecil Pashley—who must, by now, have put in as many instructional hours as any other pilot in the world—is, once again, in charge of flying.

FORTHCOMING EVENTS

July 13th.—Deauville Rally.

Aug. 22nd.—Model Engineer Exhibition opens at the New Horticultural Hall, Vincent St., Westminster, London, S.W.1. (11 a.m.)

Sept. 9th.—Ministry of Civil Aviation demonstrations of technical radio equipment. More details pending.

Sept. 12th and 13th.—S.B.A.C. Flying Display and Exhibition, Handley Page Airfield, Radlett, Herts.

Nov. 15th.—Paris Aero Show, Grand Palais, Champs Elysees.

Nov. 15th.—Engineering exhibition, Kelvin Hall, Glasgow.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

FLIGHT OF BIRDS

Does the Leader Get Tired of Leading ?

I AM very interested in the remarks made by Mr. Stanley Bradshaw (*Flight*, May 9th) and Mr. Labye (*Flight*, June 27th) on "formation flying" by birds.

No one can say why the leader changes position frequently. I think that perhaps the one in the lead sets a little faster pace, soon gets tired, and drops back to allow another to take its place.

The "V" formation after all is the best formation in which to fly; the best view is obtained with the minimum of concentration.

R. C. JAWKINS.

RUNWAY CONTROLLERS

Lower Age Limit Too high

ABOUT two years ago, Indicator discussed the use of Airfield Controllers in the R.A.F. and the adoption of a similar idea in post-war civil aviation. The M.o.C.A. is apparently adopting a similar idea—"Runway Controllers"—but may I, through your columns, protest against the decision to establish 25 as the lower age limit.

My application has been shelved because at 23½ I am not yet eligible, and it was suggested that I obtain other employment and apply again when I am 25. As this would probably involve my becoming completely out of touch with control work (M.o.C.A. seem to hold all the strings) I fail to see in just what way I shall be more suited at the age of 25 than I am at present—quite the reverse, in fact.

Having just completed 5½ years' service in the R.A.F., the advantages of being released under the A. & S. scheme are completely lost to me, and I feel that the M.o.C.A. should fall in line and adjust its age limits to embrace released service personnel.

At 19 a pilot, at 21 an airfield controller in Burma, yet at 23 too young to continue!

By the way, "Flying Instructor" (*Flight*, June 27th) complains that Training Command was left out of the V-Day fly past, but did he see the "Oxford" and "Tiger Moth" exhibited in Green Park as part of the V-Day celebrations?

P. J. CROFTS.

VICTORY FLY-PAST

Air Ministry Explanation to an M.P. on Exclusion of Training Command

From the Hon. George Ward, M.P.

YOUR correspondent's letter published in your issue of June 27th prompts me to draw your attention to my question addressed to the Under-Secretary of State for Air on May 15th, in which I asked why aircraft of Flying Training Command were to be excluded from the Victory Fly-past.

The Under-Secretary's reply was not at all satisfactory, giving as his only reason "practical problems such as rendezvous, timing and control."

I find it difficult to believe that such problems could not have been solved, and I still think that, to the general public, the sight of Tiger Moths, Harvards, and Oxfords leading the operational squadrons would have been a most striking demonstration of the phases of training through which our pilots had to pass before graduating to operational types.

Having myself served in Flying Training Command for a number of years during the war, I am well aware of the exacting work undertaken by flying instructors. I also know what little recognition they received either by awards or in such matters as leave and additional petrol enjoyed by operational pilots. Moreover, the scant publicity given to their work by the Press was in inverse proportion to their magnificent contribution to victory.

In refusing the Command representation in the Fly-past, the Air Ministry missed a fine opportunity of showing the public its appreciation of the achievements of Flying Training Command without whose labours the great fleets of bombers and fighters could not have taken the air.

GEORGE WARD.

House of Commons.

[The full text of Mr. Strachey's reply in the House of Commons on May 15th was: "We should have been glad to have had aircraft of all Commands taking part in the Victory Parade, but practical problems, such as rendezvous, timing, and control, set a limit to the size of this combined operation with the Fleet Air Arm, and we felt it would be right to choose the best-known war types. This is in no sense a reflection on the achievements of Flying Training Command, which, with all the other Commands, will, of course, be represented in the marching column."—ED.]

Training Command's Jealousy ?

WHY must certain members of Training Command give such a poor impression of that Command by exhibiting regrettable jealousy at every conceivable opportunity?

I refer not only to a letter published in *Flight*, June 27th, by "A Flying Instructor," but also to the previous contention regarding campaign stars.

Operational types will, I am sure, acknowledge the valuable and indispensable work done by instructors, but is "Flying Instructor" suggesting that operational flying is "a piece of cake," or has he merely that instructor-pupil complex (really an inferiority one) so noticeable at most training stations?

Let us drop this silly quest for recognition, or some one may be more outspoken than me in regard to the types who "would have given a good deal to have been posted to a squadron in place of their pupils."

ONE TOUR MAN.

LONDON AIRPORT

Disastrous Policy in the Past

RECENT comments and criticisms in the Press regarding the apparently inadequate accommodation and facilities for air travellers at Britain's premier airport at Heathrow, deserves some comment from you. So far, I have not had the pleasure of noting any.

We are now only just beginning to realize just how disastrous has been the policy of those who were entrusted with these problems. And the public in general, I am sure, is also just beginning to realize that, like Rome or London, or any other place, aircraft and airfields cannot be built in a day.

Only this morning, May 31st, I read an article in my morning paper stating that some new and hitherto secret types of aircraft just announced by Mr. Wilmot, the Minister of Supply (I quote), "Should be ready for service in four or five years . . . " Readers please note—"four or five years." Also, why secret?

These facts reveal (and present facilities considered can only give weight to) the complete sterilization of past—I hope—policy, and I wonder whether this result was because the actions of those in authority were completely nullified by higher authority, or whether those concerned were just unequal to their responsibilities. However, be that as it may, we are certainly passing through a very embarrassing period.

Six long years passed and not a single civil airline aircraft was allowed to be produced. Even the Fairey Aviation Co.'s project, on which much of the preliminary work had been completed, was shelved.

We all know that the aircraft industry was hard pressed during the war, but one vital factor appears to have been overlooked; that transport aircraft were almost as vital as bombers and fighters, particularly at the latter stage of the war. Hundreds of this type of aircraft were urgently required; and who supplied them?—America! A handful of skilled men in the several factories could have been engaged upon building prototypes without in any way affecting production of fighters and bombers.

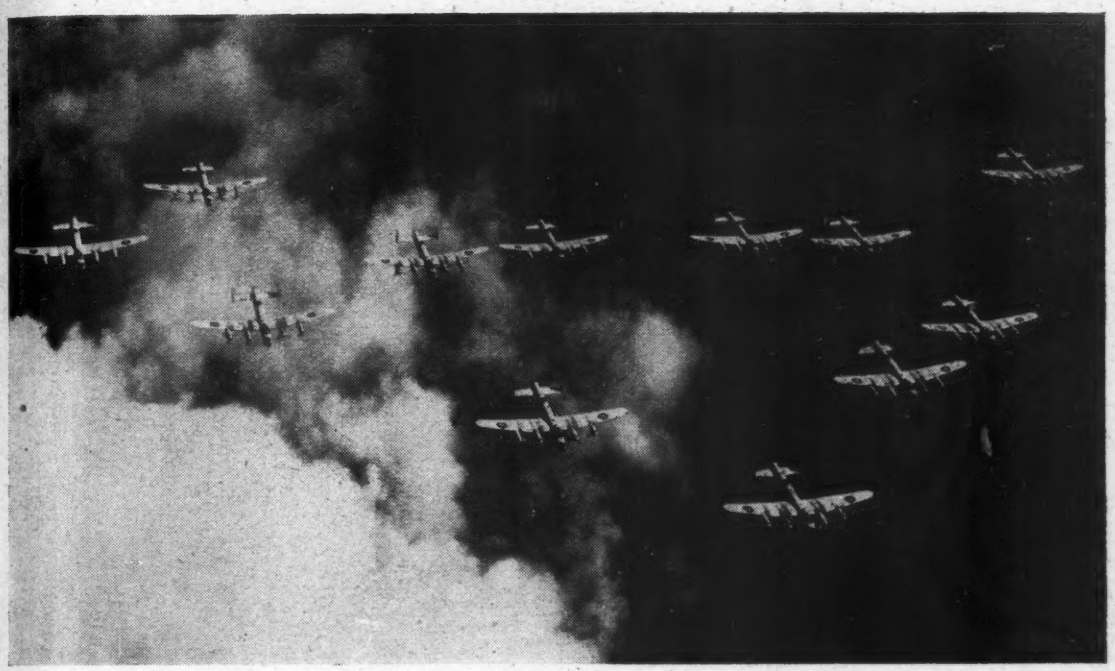
Our present hopeless inferiority, temporary as it may be, is the work of *past* masters. Any inconvenience which is now being suffered must be laid at the feet of those who were responsible, and must be answered by them. It is unfair to place this blame on those who have just taken up the decayed remains and are attempting to remove the rot—the first essential step before any other in the arduous task of complete restoration—and I don't owe allegiance to any political party.

But was British civil aviation *ever* on a sound and enterprising basis?

E. G. SMART.

[Comments on the accommodation situation at London Airport, Heathrow, appeared in Flight on May 30th under the descriptive title of "Tented Terminal." The general situation there, as far as building and development are concerned, has been dealt with many times during the past few months. The fact that no transport types of aircraft were produced by this country during the war was due entirely to the arrangements made under the lease-lend terms. Whether or not, as our correspondents suggests, this decision was a tactical error, must be left to the judgment of history.—ED.]

SERVICE AVIATION



GOOD WILL MISSION : A new and impressive cloud study of twelve Lancasters of No. 35 Squadron. The Squadron left Gravely for America on July 8th to take part in the U.S. Air Force Day celebrations on August 1st. Some of the ground crews are making the journey in Avro Yorks.

Royal Air Force and Naval Air Arm News and Announcements

11 Group's Tenth Anniversary

MANY famous figures who fought and planned the Battle of Britain attended a reception to mark the tenth anniversary party of No. 11 Group, R.A.F. Fighter Command, at Group Headquarters.

The A.O.C., Air Vice-Marshal S. D. MacDonald, C.B.E., D.F.C., and other officers of the Group acted as hosts. Former A.O.C.s present were Air Chief Marshal Sir Philip Joubert, K.C.B., C.M.G., D.S.O. (under whom the Group was formed in June, 1936), Air Marshal Sir W. Welsh, K.C.B., D.S.C., A.F.C., and Air Comdre. D. A. Boyle, K.B.E., A.F.C. Fighter Command representatives included the A.O.C.-in-C., Air Marshal Sir James Robb, K.B.E., C.B., D.S.O., D.F.C., A.F.C.; the S.A.S.O., Air Vice-Marshal S. F. Vincent, C.B., D.F.C., A.F.C.; and the A.O.A., Air Vice-Marshal Sir H. Broadhurst, C.B.E., D.S.O., D.F.C., A.F.C.

Among the guests who fought in the Battle of Britain were Group Capt. D. R. S. Bader, D.S.O. and Bar, D.F.C. and Bar, Group Capt. J. Cunningham, D.S.O. and two Bars, D.F.C. and Bar, Wing Cdr. J. R. D. Braham, D.S.O. and Bar, D.F.C. and two Bars, and Sqn. Ldr. C. F. Rawnsley, D.S.O., D.F.C., D.F.M.

The brunt of the Battle of Britain fell upon 11 Group, then commanded by Air Vice-Marshal (now Air Chief Marshal) Sir Keith Park. When the Luftwaffe exerted its maximum effort between the second week in August and the third in September, 1940, nearly all its attacks fell on the Group and a few squadrons from flanking sectors. Against it was deployed nearly the whole strength of the German Air Force.

Mosquito Mail Service Ends

ON Sunday morning two Mosquitoes of No. 162 Squadron, Transport Command, took off from Blackbushe airfield to make the final delivery of the world's fastest air mail service to the European capitals.

When the European war ended, No 162 Squadron, then in Bomber Command's Pathfinder Group, was transferred to Transport Command, to ensure speedy delivery of mail between England and different parts of the Continent. The Squadron has flown regular mail services to Oslo, Copenhagen, Prague, Vienna, Rome, Naples and Athens.

The Bomber Command experience of the aircrews engaged on the mail runs has helped to cut down flying times, for halts were made only at the most important points, and the remainder of the mail was dropped in containers.

During its twelve months of operating the service, Transport Command has proved the immense possibilities of running a fast air mail service in all weathers.

R.A.F. Education Branch

THE Air Council has approved the formation of an Education Branch to replace the civilian Education Service which has existed since 1918. Although during the war education officers received R.A.F.V.R. commissions they retained their civilian conditions of service throughout.

The new Education Branch, which will consist of commissioned officers only, will allow educational instructors to take a fuller place in Service life, and enable them to exercise their duties more effectually.

Members of the Branch will enter at an average age of 25, as flying officers, after having civil teaching experience.

Appointments

AIR VICE-MARSHAL J. W. BAKER to be Director-General of Personnel, Air Ministry.

Air Vice-Marshal F. J. Fogarty to be A.O.C. Administration, R.A.F. H.Q., Mediterranean and Middle East.

Air Vice-Marshal L. Darvell to be A.O.C. Air H.Q., Italy.

Air Comdre. A. MacGregor to be A.O.C. Administration, Air H.Q., Italy.

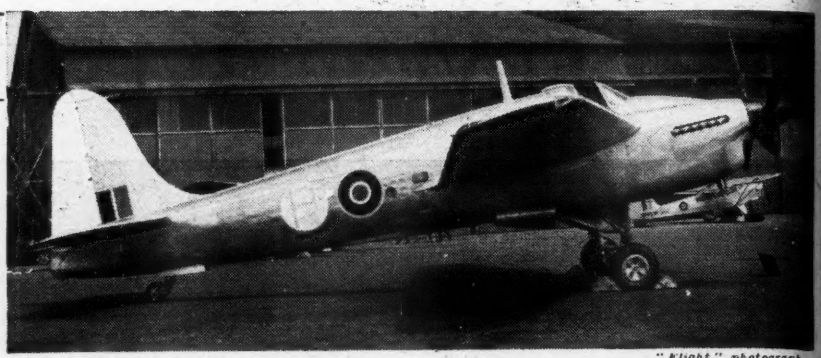
Roll of Honour

Casualty Communiqué No. 592.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties in

SERVICE AVIATION

NAVAL NOVELTY: The prototype Short Sturgeon deck-landing two-seat reconnaissance aircraft, lately displayed at R.A.E. Twin R.-R. Merlin S.M. engines drive contra-rotating Rotol airscrews. Forward of the "P" prototype marking are three cameras, the fairing for which can be seen beneath the fuselage.



"Flight" photograph

action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list 300 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. D. W. Andrews; Flt. Sgt. E. Atterby; F/O. G. J. Austin; Sgt. R. Bailey; Act. F/O. R. S. Bastick; Sgt. R. Beales; Act. Flt. Lt. D. Belot, D.F.C.; Flt. Sgt. R. P. Belshaw; Sgt. R. Black; Sgt. A. G. Briggs; Flt. Sgt. H. H. Briggs; Flt. Sgt. E. W. Browne; Flt. Sgt. E. J. Budd; Sgt. W. L. Burbidge; Sgt. G. H. Burch; Flt. Sgt. G. B. Burns; Sgt. C. F. P. Burridge; Flt. Sgt. H. Callaghan; Flt. Sgt. L. E. Cannock; Flt. Sgt. G. Cartwright; Sgt. W. A. A. Chatters; Flt. Sgt. D. W. Clark; F/O. A. C. Cockayne; Flt. Sgt. R. M. Cocozza; Flt. Sgt. C. Cole; Sgt. S. McA. Coles; Sgt. T. Cooney; Flt. Sgt. P. Cotton; Flt. Sgt. F. J. Court; Sgt. E. P. Coutts; Flt. Sgt. S. Craddock; Flt. Sgt. C. Daintith, D.F.M.; Sgt. J. Davies; Flt. Sgt. E. J. Day; Flt. Sgt. T. G. W. Dew; Act. Flt. Lt. R. F. Dobson; F/O. M. Dodds; Flt. Sgt. T. W. Doggart; Sgt. T. E. Drennan; Sgt. P. J. F. Escott; Sgt. C. Fernie; Sgt. A. C. Fox; Sgt. J. F. Fry; F/O. E. W. Gibbins; Flt. Sgt. E. W. Gibbs; Sgt. I. Giles; F/O. G. V. Goodes, D.F.M.; Sgt. B. T. Gough; Flt. Lt. H. B. Grynkiewicz; Flt. Sgt. F. C. Gubbings; Flt. Sgt. G. E. Gwalter; Flt. Sgt. D. H. Hadlow; Flt. Sgt. C. T. Hall; Sgt. C. J. Hance; Flt. Sgt. F. W. Heron; Flt. Sgt. C. F. J. Hole; Flt. Lt. R. F. Humphries; F/O. J. A. Hurley; Sgt. P. F. Ivett; Sgt. A. A. James; W/O. P. M. A. Johnston; Flt. Sgt. J. L. Jones; Flt. Sgt. A. C. Kendrick; F/O. A. N. Lacey; Flt. Sgt. V. W. Lambert; F/O. C. M. Leisk; P/O. E. J. F. McCarthy; Sgt. A. G. McKenzie; Flt. Sgt. G. Malcolm; Flt. Sgt. K. R. Marston; Sgt. C. S. Mason; Flt. Sgt. S. J. J. Maton; F/O. H. V. Miller; Sgt. J. Mitchell; Sgt. K. W. C. Moore; Flt. Sgt. J. Newby; Sgt. D. Nicholl; Sgt. R. Nolan; Flt. Lt. P. W. Norbury; Wing Cdr. V. R. Oats; P/O. H. Osbourn; F/O. G. H. Paley; Sgt. A. K. Parker; P/O. J. Pickup; P/O. R. L. Pocock; Flt. Lt. A. F. W. Polden; Flt. Sgt. R. Potter; P/O. J. W. J. Pringle; F/O. P. Radford; Sgt. C. Q. Rafferty; Sgt. R. V. Rands; Sgt. W. M. Ratcliffe; Sgt. D. J. Reeves; Sgt. J. J. Samuels; Sgt. T. I. Scott; Sgt. L. H. Shaiel-Gosling; Sgt. J. F. Shearon; P/O. W. L. Shield; F/O. B. L. Sims; Flt. Sgt. J. C. Smith; Sgt. J. T. Smith; Flt. Lt. L. A. W. Smith; Flt. Sgt. R. V. Smith; Sgt. B. L. Smout; Flt. Sgt. R. E. C. Spall; F/O. J. M. Squance; W/O. E. E. Standing; Flt. Lt. A. C. Stark; P/O. E. A. Steele; Sgt. S. J. Stephens; Sgt. M. W. Stobart; Flt. Lt. F. G. Sutton; Sgt. J. Taylor; Flt. Sgt. H. B. Tennant; Sgt. W. Thornton; Flt. Sgt. W. J. C. Turner; Flt. Sgt. M. Venton; Sgt. D. Wager; Flt. Sgt. S. W. Wentworth; F/O. J. Whitter; Sgt. F. C. Williams; Flt. Lt. R. G. Young.

PREVIOUSLY REPORTED MISSING, NOW REPORTED KILLED IN ACTION.—Sgt. J. L. Hartley.

MISSING.—L.A/C. M. F. Armstrong; Flt. Sgt. H. Beard; Cpl. A. Bell; L.A/C. R. V. Dunning; Sgt. L. W. Finch; L.A/C. S. W. Gottheimer; L.A/C. A. O. Hampton; Cpl. E. G. Hewlett; Cpl. W. Jude; Flt. Lt. M. C. S. Long; L.A/C. W. McAllister; Sgt. W. E. Malley; Cpl. J. Mills; L.A/C. W. S. Roberts; L.A/C. R. Shipley; L.A/C. C. G. Smith; L.A/C F. W. Wilkinson; Sgt. A. Williams; L.A/C. R. H. Willman; L.A/C. R. C. E. Young.

KILLED ON ACTIVE SERVICE.—Sgt. R. G. J Fair; W/O. T. Hall; A/C.1 S. Laing; Flt. Sgt. E. J. Marks; Flt. Sgt. F. T. Martin; Flt. Sgt. R. C. Mavers; W/O. W. R. Walker.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Flt. Sgt. D. F. Hamblett; W/O E. B. Lascelles; Flt. Sgt. K. O'Neill; F/O. P. F. Parsons; Flt. Sgt. F. S. Urquhart.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED ON ACTIVE SERVICE, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. S. T. Norfolk.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. E. A. Amzalak; Sgt. F. K. Clough; F/O. H. Coburn; Sgt. R. Girling; Sgt. P. E. Humphries; Flt. Lt. G. E. McBride; Sgt. A. D. Morgan; Flt. Sgt. G. P. Morris; Flt. Sgt. F. W. Peace; W/O. B. E. D. Snowden; Flt. Lt. W. G. Steele; Sgt. W. C. Thacker.

DIED ON ACTIVE SERVICE.—A/C 2 L. G. Adams; A/C.1 R. C. Adley; L.A/C. A. S. Ager; Sgt. A. Berry; L.A/C H. J. Canard; A/C.1 J. E. Chappell; F/O. F. J. S. Clayden; A/C.2 S. H. Clements; A/C.2 J. M. Cowan; A/C.1 F. T. Davison; L.A/C. G. Dawson; L.A/C. T. Goldsmith; A/C.1 A. W. S. Goodman; Flt. Lt. A. G Jefferson; A/C.2 J. E. Luke; Cpl. D. H. V. Mayes; L.A/C. R. Shaw; A/C.1 D. L. Smith; L.A/C. R. L. N. Spooner; Cpl. A. Thomson; L.A/C. J. W. A. Toye; Flt. Lt. N. E. H Virgin; Cpl. A. J. Watson; A/C.1 D. C. Westlake.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—L.A/CW. V. J. Lovely.

"Flight" photograph

This photograph, taken after the passing-out parade at No. 1 Officers Advanced Training School, Digby, shows (left to right) Air Comdre. T. G. Pike, Commandant of the school; Air Marshal Sir Ralph Sorley, who took the salute; and Air Vice-Marshal C. V. Porter. The aim of the courses held at the school is to make up the leeway in administrative knowledge caused by war conditions.

Royal Australian Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. P. F. O'Donohue.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. R. H. Battye; F/O. I. S. Baudinette; Flt. Sgt. S. A. Brown; F/O C. J. Cameron; Flt. Sgt. E. G. Charman; Sqn. Ldr. J. Clark, D.F.C.; Flt. Sgt. T. T. Clarke; F/O. A. G. Comer; P/O. T. E. Craddock; P/O. A. R. F. Dunkerley; Flt. Sgt. C. L. Fincham; Flt. Sgt. A. D. Fryer; Flt. Sgt. G. Goodfellow; Act. F/O. D. Gray; Flt. Sgt. R. W. Hall; Act. Sqn. Ldr. J. C. Holmes, D.F.C.; F/O. D. G Hudspeth; Flt. Sgt. J. D. Jenner; Act. Wing Cdr. E. Le P. Langlois, D.F.C.; W/O. J. G. Lawrence; P/O. E. A. McCasker; F/O. D. MacFadyen; W/O. A. R. MacKenzie; Flt. Sgt. J. S. McLay; W/O. E. O. T. Mayne; Act. F/O. J. Milne; Act. Flt. Lt. T. E. V. Morgan, D.F.M.; P/O. R. K. Norsworthy; F/O. E. C. Patten; P/O. T. S. Powe; Flt. Sgt. J. F. Prince; P/O. W. K. Quill; F/O. A. F. Reid, D.F.C.; Act. F/O. K. W. Reilly; Flt. Sgt. G. I. Rugless; Flt. Sgt. E. M. Ryder; Flt. Sgt. F. S. B. Scougall; W/O. W. A. Simpson; F/O. G. H. B. Slinn; Flt. Sgt. R. A. Smith; W/O. D. G. Stewart; W/O. R. D. Stopher; W/O. L. J. Symonds; W/O. C. H. Terras; Flt. Sgt. A. E. Thornton; P/O J. F. Valery; Flt. Sgt. C. F. Walters; Act. F/O. R. T. Ward; Act. Flt. Lt. R. R. Witham, D.F.C.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—F/O. M. R Delaney; W/O. R. Richards.

Royal Canadian Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. R. W. Abrams; F/O. G. I. Allan; Flt. Sgt. J. W. Allan; P/O. A. G. Allen; W/O. T. W. Allen; Flt. Lt. E. L. Ashbury; W/O. N. G. Baird; P/O. E. V. Beach; P/O. C. G. Berges; P/O. H. G. Bishop; F/O. L. A. Blaney; F/O. B. F. Boyle; P/O. J. W. Brown; F/O. W. A. Brydon; F/O. J. R. Burton; Flt. Sgt. T. G. Campbell; Flt. Sgt. A. S. B. Campton; F/O. G. R. Cheesman; P/O. A. B. Clark; F/O. A. J. Combaz; Flt. Lt. G. F. Coward; P/O. C. M. Crabtree; P/O. G. D. Daughters; Wing Cdr. R. F. Davenport; P/O. J. M. De Macedo; P/O. F. W. Dobbs; F/O. T. M. Draper; F/O. W. T. Dunkeld; P/O. G. Durnan; F/O. G. W. Exel; F/O. J. P. Farrell; F/O. R. E. Fennell; WO. H. L. Ferguson; Sgt. W. H. G. Field; F/O. M. G. Fife; F/O. L. Flack; P/O. G. G. Fox; Flt. Sgt. M. Frank; P/O. C. W. Fraser; Flt. Lt. J. H. Freeman; P/O. J. D. Gibbons; F/O. L. J. R. Gregoire; Flt. Lt. D. H. Gross; P/O. R. B. Gunderson; P/O. H. Guttorm-son; P/O. J. Gyname; F/O. R. D. K. Hanbidge; F/O. G. W. Hess; P/O. D. W. Hodge; P/O. A. J. Hunter; P/O. W. J. Jackson; W/O. W. A. John-son; P/O K. R. Joslin; P/O. J. J. M. Kastner; P/O. G. A. Kennedy; Sgt. J. Klem; F/O. O. W. Knight; F/O. J. R. Latremouille; P/O. C. E. Lecky; F/O. C. A. Lee; W/O. G. W. Lee; Sgt. M. L. Long; F/O. Q. J. Louie; F/O. V. P. Mc-Allister; Flt. Sgt. G. W. McClelland; Flt. Sgt. J. L. MacDonald; P/O. K. C. McKeown; F/O L. H. McLeod; Flt. Lt. W. S. McLintock; F/O C. W. McMillan; Flt. Lt. G. M. S. McMorran; F/O. B. T. MacNeill; Flt. Lt. J. N. McPhee; P/O. R. W. Mahr; Flt. Lt. J. A. Miller; P/O. A. I. Minguet; Flt. Lt. C. G. Mitchell; P/O. R. L. Mitchell; Flt. Lt. W. G. Oldham; Flt. Lt. H. D. O'Neill; F/O. E. A. Oswald; W/O. B. R. Nelson; P/O. J. S. Netzke; Flt. Sgt. G. J. Phillips; P/O. T. C. Pierson; F/O. C. J. P. Ramsey; Flt. Sgt. E. G. C. Richards; F/O. W. Rink; F/O. G. A. Robinson; Flt. Lt. D. A. Ross; Flt. Lt. D. M Sanderson; F/O. E. L. Saslove; F/O. S. L. Saxe; F/O. M. Shatzky; Flt. Lt. C. L. Shaver; F/O. W. E. Short; W/O. G. W. Stairs; F/O. D. A. Standfield; P/O. J. Street; F/O. J. W. Thomp-son; F/O. R. F. Thompson; W/O. A. F. D. Turner; W/O. L. W. Webster; Flt. Sgt. W. A. Wegenast; P/O. J. H. Wilson; Flt. Sgt. R. M Wood; F/O. R. A. Young.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED ON ACTIVE SERVICE.—Sgt. W. G. Anderson; F/O. I. T. Cromb; Sgt. H. R. Latham; Flt. Lt. E. W. Martin.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—F/O. R. B. Anderson.